Service
Service
Service

14PV210/01/07/39
14PV210/58/75/75S
14PV320/01/05/39
14PV325/05S/39S
14PV327/05B/39B
14PV340/01/05/39/58
14PV345/05S/39S
20PV220/01/07
21PV210/75/75S

21PV320/01/05/39
21PV520/58
25PV720/07/39
37TR215/03/39
51TR225/03/39
37TVB50/39
51TVB60/39

14PV210

Evolution: AA

Service Manual

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Survey of versions:

/01/03	PAL B/G (with VPS)
/05	PAL I UK
/07(mono)	PAL I Ireland
/07(stereo)	PAL/SECAM B/G,D/K,K1,I,L,L'
/39	PAL/SECAM B/G,D/K,K1,I,L,L'
/58	PAL/SECAM B/G,D/K
/75	PAL B/G,I

Safety regulations require that the set is restored to its original condition and that parts which are identical to those specified are used.

Remote control:

14PV210/01/07/39/58/75/75S 14PV320/01/05/39 20PV220/01/07	RT790/101	8622 667 90101
14PV325/05S/39S 14PV327/05B/39B	RT791/101(silver)	8622 667 91101
21PV320/01/05/39 21PV520/58 25PV720/07/39 21PV210/75/75S	RT795/101	8622 667 95101
14PV340/01/05/39/58	RT796/101	8622 667 96101
14PV345/05S/39S	RT797/101(silver)	8622 667 97101
37TR215/03/39 51TR225/03/39 37TVB50/39 51TVB60/39	RT790/201	8622 667 90201

Tape Deck:

14PV210/01/07/39/75/75S 14PV320/01/05/39 14PV325/05S/39S 14PV327/05B/39B 14PV340/01/05/39/58 14PV345/05S/39S 20PV220/01/07 21PV210/75/75S 21PV320/01/05/39 37TR215/03/39, 37TVB50/39 51TR225/03/39, 51TVB60/39	WDQT-P2/0 LP
14PV210/58	WDQT-P2/0
21PV520/58	WDQT-S4/0
25PV720/07/39	WDQT-S4/2

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PHILIPS

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SURVEY OF SETS AND FEATURES

	14PV210/01	14PV210/07	14PV210/39	14PV210/58	14PV210/75	14PV210/75S	14PV320/01	14PV320/05	14PV320/39	14PV325/05S	14PV325/39S	14PV327/05B	14PV327/39B	14PV340/01
General														
Screen size	14"	14"	14"	14"	14"	14"	14"	14"	14"	14"	14"	14"	14"	14"
Mono	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stereo														
Presets and Timer Back-up time	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year
Clock and Calendar Back-up time	30min	30min	30min	30min	4days	4days	30min	30min	30min	30min	30min	30min	30min	30min
Number of Presets	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Reception														
Number of Tuners	1	1	1	1	1	1	2	2	2	2	2	2	2	1
NICAM														
PAL B/G	✓						✓							✓
PAL B/G,D/K SECAM B/G,D/K				✓										
PAL I		✓						✓		✓		✓		
PAL B/G,I					✓	✓								
PAL B/G,I SECAM B/G,L/L'			✓						✓		✓		✓	
PAL B/G,D/K,I SECAM B/G,D/K,K1,L,L'														
Automatic Channel Install. (ACI)	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
Auto Store +					✓	✓								
Sound														
Music Power Output MPO [Watts]	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Number of Speakers	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Virtual Dolby Surround														
Connectors		✓						✓		✓		✓		
Scart 1 plug (RGB Input)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Scart 2 plug														
Cinch Stereo Rear out														
Audio/Video Side Connector	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Headphones Jack 3,5mm	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Teletext														
TXT (1 page memory)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TXT (10 page memory)														
TOP														
FLOF	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓
Time/Date Download (Smart Clock)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tape Deck														
Number of Video Heads	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Number of FM-Audio Heads														
Winding Time sec. (E180)	260	260	100	100	100	100	100	100	100	260	100	100	100	100
Rewind Time sec. (E180)	170	170	100	100	100	100	100	100	100	170	100	100	100	100
Autom. Tape Length Recogn.					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Video Longplay (2 head LP)	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Video Longplay (4 head LP)														
Programming														
VPS/PDC	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
Gemstar ShowView	✓		✓	✓		✓	✓		✓		✓		✓	✓
Gemstar VideoPlus		✓						✓		✓		✓		
Color of set														
Grey	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓
Black														
Blue Metallic												✓	✓	
Silver										✓	✓			
Titanium														
On Tape standard														
MESECAM			✓	✓					✓		✓		✓	
PAL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SECAM			✓						✓		✓		✓	
Features														
Child Lock	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VCR1/VCR remote address selection														
Hotel Mode	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NTSC 3,58 via Scart-IN					✓	✓								
Wide screen switching (manually)							✓	✓	✓	✓	✓	✓	✓	✓
Edge Noise Canceller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Record Prepared Scart 1														
Digital Studio Picture Control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NTSC-Playback in color (HIFI)														
NTSC-Playback in color	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FM-Radio														✓
Buzzer														✓

14PV340/05	14PV340/39	14PV340/58	14PV345/05S	14PV345/39S	20PV220/01	20PV220/07	21PV210/75	21PV210/75S	21PV320/01	21PV320/05	21PV320/39	21PV520/58	25PV720/07	25PV720/39	37TR215/03	37TR215/39	37TVB50/39	51TR225/03	51TR225/39	51TVB60/39
4"	14"	14"	14"	14"	20"	20"	21"	21"	21"	21"	21"	21"	25"	25"	14"	14"	14"	20"	20"	20"
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
													✓	✓						
ear	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year	1year
min	30min	30min	30min	30min	30min	30min	4days	4days	4days	4days	4days	4days	4days	4days	30min	30min	30min	30min	30min	30min
9	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
1	1	1	1	1	2	2	1	1	2	2	2	2	2	2	1	1	1	2	2	2
													✓	✓						
					✓				✓						✓			✓		
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		✓					✓	✓							✓	✓	✓	✓	✓	✓
3	3	3	3	3	5	5	5	5	5	5	5	5	20	20	3	3	3	5	5	5
1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1
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2	2	2	2	2	2	2	2	2	2	2	2	4	2	2	2	2	2	2	2	2
2			2																	
00	260	100	260	260	260	260	100	100	100	100	100	100	100	100	260	260	260	260	260	260
00	170	100	170	170	170	170	100	100	100	100	100	100	100	100	170	170	170	170	170	170
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SURVEY OF THE BOARDS

	Recorder Unit Board	RUBAD1	RUBAD2	RUBAD3	RUBAD4	RUBAD5	RUBAD6	RUBAD7	RUBAD8	RUBAD9	RUBAD10	RUBAD11	RUBAD12	RUBAD13	RUBAD15	RUBAD16	RUBAD18	RUBAD19	**TV-Board**	TVBAD14/BG	TVBAD14/BGI	TVBAD14/BGL	TVBAD14/BGLO	TVBAD14/BGLR	TVBAD14/BGLT	TVBAD14/BGO	TVBAD14/BGR	TVBAD14/BGT	TVBAD14/DK	TVBAD14/DK
14PV210/01		✓																		✓										
14PV210/07		✓																												
14PV210/39				✓																		✓								
14PV210/58		✓																											✓	
14PV210/75			✓																		✓									
14PV210/75S			✓																		✓									
14PV320/01														✓														✓		
14PV320/05																✓														
14PV320/39																		✓							✓					
14PV325/05S																✓														
14PV325/39S																		✓							✓					
14PV327/05B																✓														
14PV327/39B																		✓							✓					
14PV340/01						✓																					✓			
14PV340/05						✓																								
14PV340/39							✓																	✓						
14PV340/58						✓																								✓
14PV345/05S						✓																								
14PV345/39S							✓																	✓						
20PV220/01															✓															
20PV220/07																	✓													
21PV210/75			✓																											
21PV210/75S			✓																											
21PV320/01										✓																				
21PV320/05								✓																						
21PV320/39											✓																			
21PV520/58									✓																					
25PV720/07												✓																		
25PV720/39												✓																		
37TR215/03					✓																					✓				
37TR215/39					✓																		✓							
37TVB50/39					✓																		✓							
51TR225/03															✓															
51TR225/39													✓																	
51TVB60/39													✓																	

TVBAD14/DRR	TVBAD14/I	TVBAD14/IR	TVBAD14/IT	TVBAD20/BGLT	TVBAD20/BGT	TVBAD20/BGTSF	TVBAD20/ITSF	TVBAD21/BGISF	TVBAD21/BGLTSF	TVBAD21/BGTSF	TVBAD21/DKTSF	TVBAD21/ITSF	TVBBD25/MSTV	**Audio Board**	APDOD-P3	**Sound Feature Board**	SFDP1	SFDP2	**Mainsfilter Board**	MFSWD	**Radio Module**	ECO 5/01-2B	**Key Board**	KB1D	KB2DP	KB2DB	**Central µC - AIO (Pos. 7900/RUB)**	DTAP1/2 - U.xxx	DTAP5 - U.xxx	**TXT-µC - Painter (Pos. 7804/TVB)**	DTXU1 - U.xxx	**Tape Deck**	WDQT-P2/0 LP	WDQT-P2/0	WDQT-S4/0	WDQT-S4/2
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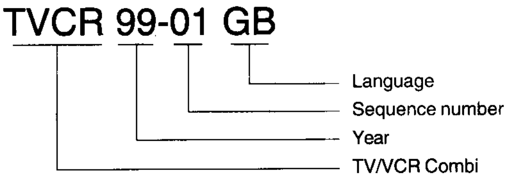
I. SUMMARY
A. MODIFICATIONS

1. UPDATING THE SERVICE MANUAL

All modifications and/or supplements to the Service Manual are published by means of Service Information bulletins.

Each Service Information is numbered:


TVCR 99-01 GB
Language
Sequence number
Year
TV/VCR Combi

A Service Information bulletin consists of a front page which, if needed, is followed by supplementary and/or replacement sheets.

Replacement sheets should replace existing sheets in the Service Manual. These sheets are identified by an additional letter after the page number.
Example: Page 5-1a replaces page 5-1 in the Service Manual.

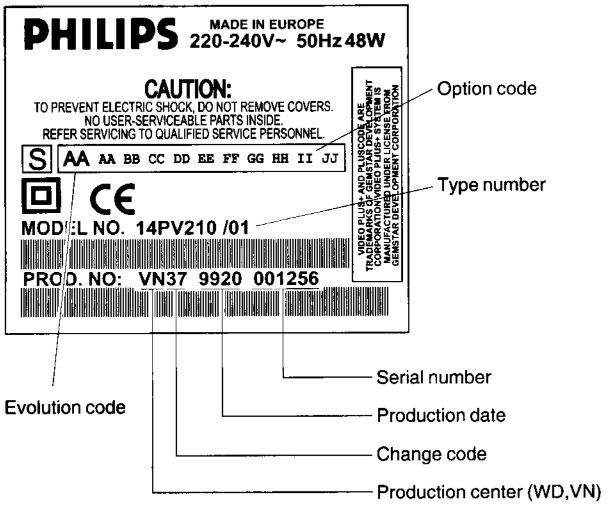
Supplementary sheets should be inserted between existing sheets in the Service Manual. These sheets are identified by an additional figure after the page number.
Example: Page 5-1-1 should be inserted after page 5-1.

2. MODIFICATIONS IN THE SET

All important parts of the set (such as the tape deck, the printed circuits and modules) are equiped with a sticker. Those stickers provide a number of important information.

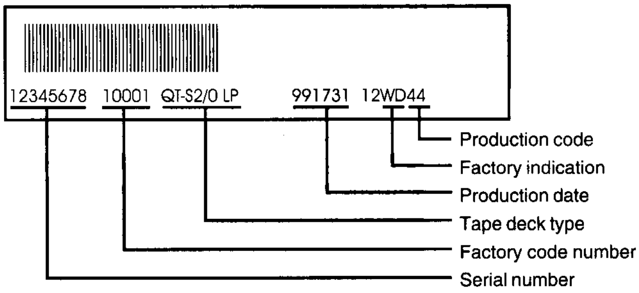
• Type plate

The type plate is located on the back cover.


PHILIPS
MADE IN EUROPE
220-240V~ 50Hz 48W
CAUTION:
TO PREVENT ELECTRIC SHOCK, DO NOT REMOVE COVERS.
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.
S
AA AA BB CC DD EE FF GG HH II JJ
CE
MODEL NO. 14PV210 /01
PROD. NO: VN37 9920 001256
VIDEO PLUS+ AND PLUSCODE ARE TRADEMARKS OF GEMSTAR DEVELOPMENT CORPORATION VIDEO PLIUS+ SYSTEM IS MANUFACTURED UNDER LICENSE FROM GEMSTAR DEVELOPMENT CORPORATION
Option code
Type number
Evolution code
Serial number
Production date
Change code
Production center (WD,VN)

Note :
- In case of an important change in the set, the production code on the type plate is incremented: E.g. 37 becomes 38.
- In case of a major change in the set, the evolution code is incremented: E.g. AA becomes AB.

• Tape deck

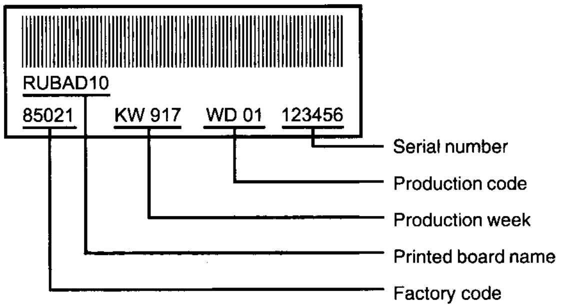

12345678 10001 QT-S2/0 LP 991731 12WD44
Production code
Factory indication
Production date
Tape deck type
Factory code number
Serial number

Note :
The production code and the serial number on the tape deck do not correspond to the production code and the serial number on the type plate.

• Printed circuits

The sticker is generally located on the copper side of the board.

Example :


RUBAD10
85021 KW 917 WD 01 123456
Serial number
Production code
Production week
Printed board name
Factory code

Note :
The production code number might not always be mentioned.

In case of an important modification, the last figure of the factory code number (point number) is increased by one: E.g. 8502.1 becomes 8502.2.

I Avvertimenti

- Le prescrizioni di sicurezza richiedono che l'apparecchio sia ricondotto alle condizioni originali e che siano usati ricambi originali. Componenti di sicurezza sono marcati con ⚠

- Tutti gli IC e semiconduttori sono sensibili a scariche elettrostatiche (ESD). Noncuranze durante la riparazione di semiconduttori possono danneggiarli o condurre ad una riduzione drastica della durata. Durante la riparazione assicurarsi di essere collegati allo stesso potenziale attraverso un bracciale di protezione contro scariche elettrostatiche. Inoltre tenere anche tutti i componenti e gli attrezzi a questo potenziale.
- Apparecchi dà riparare bisogna collegarli sempre via un trasformatore isolante (separatore) alla tensione normale.

– Non scambiare moduli o altri componenti quando l'apparecchio è in funzione.

- Per l'accordo usare soltanto attrezzi di plastica (non usare attrezzi metallici). Cosí si evitano cortocircuiti e collegamenti instabili.

Osservazioni

- Misurare le tensioni continue e gli oscillogrammi riferiendosi alla massa dell'apparecchio.
- Le tensioni continue e gli oscillogrammi indicati negli schemi di collegamento devono essere misurati secondo le condizioni seguenti: segnale barre colore, portante dell'immagine su: 503.25 MHz (C25).
- Gli oscillogrammi e le tensioni continue sono misurati in RECORD o PLAYBACK.
- I componenti indicati nelle liste sono intercambiabili con quelli nell'apparecchio nonostante l'eventuale denominazione di modelli.

E Avisos

- Las instrucciones de seguridad exigen que después de la reparación el aparato se encuentre en el estado original y que las piezas de repuesto, utilizadas para la reparación, sean idénticas a las originales.

Los componentes de seguridad estan marcados con ⚠

- Todos los IC y semiconductores son sensibles a descargas electrostáticas (ESD). Un tratamiento no conforme a las instrucciones de semiconductores en caso de reparación, podría llevar a la destrucción de estos componentes, o a una reducción drástica de la duración. Tenga cuidado de que, en caso de reparación, estar al mismo potencial que la masa del aparato, por una pulsera con resistencia. Ponga todos los componentes, herramientas y recursos al mismo potencial.
- Para reparar un aparato hay que conectarlo siempre a la alimentación a traves de un transformador de aislamiento.
- Cuando un aparato está en marcha no pueden ser cambiados módulos u otras piezas de repuesto.
- Para los ajustes hay que utilizar exclusivamente herramientas de plástico (nunca herramientas metálicas). Así se evitaran cortocircuitos y circuitos inestables.

Notas

- Hay que medir las tensiones continuas y los oscilogramas contra la masa del aparato.
- Las tensiones continuas y los oscilogramas mencionados en los esquemas tienen que ser medidos de manera siguiente: señal barra de color portadora de imagen en 503.25MHz (C25)
- Los oscilogramas y las tensiones continuas son medidas en „RECORD“ y „PLAYBACK“
- Los componentes mencionados en las listas se los puede cambiar por los componentes en el aparato, a pesar de eventuales designaciones de tipos.

GB TECHNICAL DATA	D TECHNISCHE DATEN	F CARACTERISTIQUES	
Mains voltage	Netzspannung	Tension secteur	198 - 264 V
Mains frequency	Netzfrequenz	Fréquence	45 - 65 Hz
Power consumption	Leistungsaufnahme	Puissance absorbée	14": 44W, 20": 53W 21": 65W, 25": 80W Stand By: < 4W
Ambient temperature	Raumtemperatur	Température ambiante	+10°C to +35°C
Relative humidity	Relative Luftfeuchtigkeit	Humidité relative	20 - 80 %
Dimensions	Abmessungen	Encombrement	14": 392 x 398 x 407mm (W/H/D) 20/21": 510 x 505 x 482mm 25": 580 x 573 x 460mm
Weight	Gewicht	Poids	14": 13kg, 20": 21kg 21": 23kg, 25": 32kg
Fast forward/rewind time	Vor-/Rückspulzeit	Temps (re-)bobinage	260/170s, 100/100s (E180)
Video resolution	Video-Auflösung	Résolution vidéo	>240 lines
Audio	Audio	Audio SP:	80Hz - 10kHz (±8dB)
		Audio LP:	80Hz - 5kHz (±8dB)
		FM Audio	20Hz - 20kHz (±3dB)

NL TECHNISCHE GEGEVENS	E DATOS TECNICOS	I DATI TECNICI	
Netspanning	Tensión de red	Tensione di alimentazione	198 - 264 V
Netfrequentie	Frecuencia de red	Frequenza di rete	45 - 65 Hz
Opgenomen vermogen	Consumo de potencia	Potenza assorbita	14": 44W, 20": 53W 21": 65W, 25": 80W Stand By: < 4W
Omgevingstemperatuur	Temperatura ambiente	Temperatura ambiente	+10°C to +35°C
Relatieve vochtigheid	Humedad relativa	Umiditá relativa	20 - 80 %
Afmetingen	Dimensiones	Dimensioni	14": 392 x 398 x 407mm (W/H/D) 20/21": 510 x 505 x 482mm 25": 580 x 573 x 460mm
Gewicht	Peso	Peso	14": 13kg, 20": 21kg 21": 23kg, 25": 32kg
Vooruit/terugspoeltijd	tiempo de (re-)bobinado	Tempo di (ri-)avvolgimento	260/170s, 100/100s (E180)
Opplossend vermogen	Resolución video	Risoluzione video	>240 lines
Audio	Audio	Audio SP:	80Hz - 10kHz (±8dB)
		Audio LP:	80Hz - 5kHz (±8dB)
		FM Audio	20Hz - 20kHz (±3dB)

(GB) Safety instructions

- Safety regulations demand that the set be restored to its original condition and that components identical with the original types be used.

Safety components are marked by the symbol ⚠

- All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair may reduce life drastically. When repairing, make sure that you are conneted with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools on the same potential.
- A set to be repaired should always be connected to the mains via a suitable isolating transformer.
- Never replace any modules or any other parts while the set is switched on.
- Use plastic instead of metal alignment tools. This in order to prelude short-circuit or to prevent a specific circuit from being rendered unstable.

Remarks

- The direct voltages and oscillograms ought to be measured relative to the set mass.
- The direct voltages and oscillograms mentioned in the diagrams ought to be measured with a colour bar signal and the picture carrier at 503.25 MHz (C25).
- The oscillograms and direct voltages have been measured in RECORD or PLAY mode.
- The semiconductors, which are mentioned in the circuit diagram and in the parts lists, are fully exchangeable per position with the semiconductors in the set, irrespective of the type designation of these semiconductors.

(F) Avertissements

- Les normes de sécurité exigent qu'après réparation, l'appareil soit remis dans son état d'origine et que soient utilisées les pièces détachées d'origine.

Les composants de sécurité sont marqués ⚠

- Tous les circuits intégrés, ainsi que beaucoup d'autres semi-conducteurs, sont sensibles aux décharges statiques (ESD). Leur longévité pourrait être considérablement écourtée si aucune précaution n'est prise pendant leur manipulation. Lors de réparations, assurez vous de bien être relié au même potentiel que la masse de l'appareil et enfilez un bracelet serti d'une résistance de sécurité. Veiller à ce que les composants ainsi que les outils que vous utilisez soient également à ce potentiel.
- Veiller à toujours alimenter un appareil à réparer à travers un transformateur d'isolement.
- Ne jamais remplacer de modules ni d'autres composants quand l'appareil est sous tension.
- Pour les réglages, utiliser des outils en plastique plutôt que des instruments métalliques; ceci afin d'éviter les court-circuits et d'exclure l'instabilité dans certains circuits.

Observations

- La mesure des tensions continues et des oscillogrammes doit se faire par rapport à la masse de l'appareil.
- Les tensions continues et les oscillogrammes figurant sur les schémas ont été relevés avec une mire de barre couleur modulée sur 503.25 MHz (C25).
- Les oscillogrammes et les tensions sont mesurés en mode ENREGISTREMENT ou LECTURE.
- Pour un repère donné, les composants indiqués dans la nomenclature sont complètement interchangeables avec ceux montés dans l'appareil, et ce quelles que soient les indications de type ou de désignation portées sur ces composants.

(D) Sicherheitshinweise

- Die Sicherheitsvorschriften erfordern es, daß sich das Gerät nach der Reparatur in seinem originalen Zustand befindet und daß die zur Reparatur benutzten Ersatzteile mit den Originalersatzteilen identisch sind.

Sicherheits-Bauteile sind mit der Markierung ⚠ versehen.

- Alle IC's und Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD). Unvorschriftmässige Behandlung von Halbleitern im Reparaturfall kann zur Zerstörung dieser Bauteile oder zu einer drastischen Reduzierung der Lebensdauer führen. Sorgen Sie dafür, daß Sie sich im Reparaturfall über ein Armband mit Widerstand auf dem gleichen Potential, wie die Masse des Gerätes befinden. Alle Bauteile, Werkzeuge und Hilfsmittel sind auf das gleiche Potential zu legen.
- Ein zu reparierendes Gerät ist immer über einen Trenntransformator an die Netzspannung anzuschließen.
- Bei eingeschaltetem Gerät dürfen keine Module oder sonstige Einzelteile ausgetauscht werden.
- Zum Abgleich sind ausschließlich Kunststoffwerkzeuge zu benutzen (keine Metallwerkzeuge verwenden). Dadurch wird vermieden, daß ein Kurzschluß entstehen kann oder eine Schaltung instabil wird.

Anmerkungen

- Die Gleichspannung und Oszillogramme sind gegen Gerätemasse zu messen.
- Die Gleichspannungen und Oszillogramme angeführt in den Schaltbildern sollen unter folgenden Bedingungen gemessen werden: Farbbalkensignal, Bildträger auf 503.25 MHz (C25)
- Die Oszillogramme und Gleichspannungen sind in RECORD oder PLAY gemessen. Die in den Stücklisten aufgeführten Bauteile sind positionsweise voll auswechselbar gegen die Bauteile in dem Gerät, ungeachtet der etwaigen Typenbezeichnungen.

(NL) Veiligheidsinstructies

- Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, indentiek aan de oorspronkelijke, worden toegepast.

De veiligheidsonderdelen zijn aangeduid met het symbool ⚠

- Alle IC's en vele andere halfgeleiders zijn gevoelig voor elektrostatische ontladingen (ESD). Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor, dat U tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat. Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.
- Sluit een apparaat dat gerepareerd wordt altijd via een scheidingstransformator aan op de netspanning.
- Verwissel nooit modules of andere onderdelen terwijl het apparaat is ingeschakeld.
- Gebruik voor het afregelen plastic i.p.v metalen gereedschap. Dit om mogelijke kortsluiting te voorkomen of een bepaalde schakeling instabiel te maken.

Opmerkingen

- De gelijksspanningen en oscillogrammen dienen gemeten te worden ten opzichte van de apparaat aarde.
- De gelijksspanningen en oscillogrammen vermeld in de schema's dienen gemeten te worden met een kleurbalkensignaal beelddraaggolf op 503.25 MHz (C25).
- De oscillogrammen en gelijksspanningen zijn in RECORD of PLAY mode gemeten.
- De halfgeleiders, die in het pricipeschema en in de stuklijsten, zijn vermeld, zijn per positie volledig uitwisselbaar met de halfgeleiders in het apparaat, ongeacht de typeaanduiding op deze halfgeleiders.

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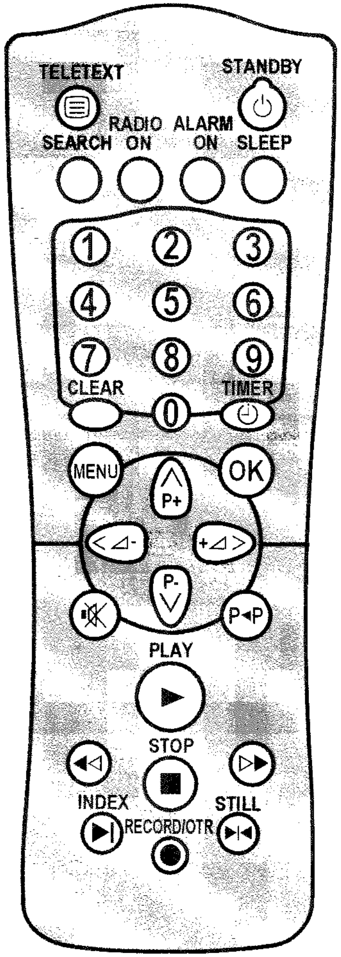
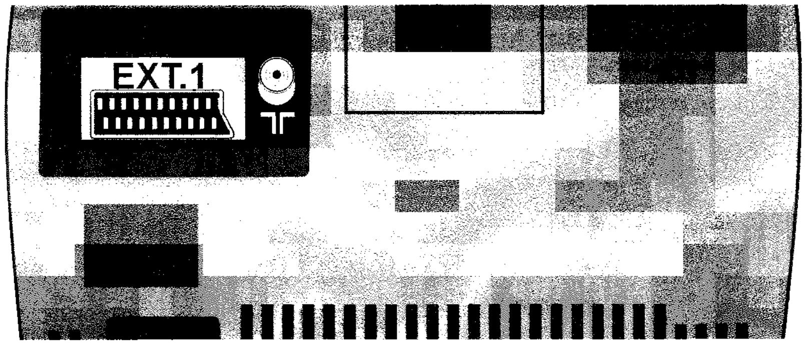
OPERATING INSTRUCTIONS IN BRIEF

The remote control



TELETEXT ⊜	**TELETEXT**: To switch TELETEXT on or off
STANDBY ⏻	**Switch off** : To switch off set, interrupt menu function, interrupt a programmed recording (TIMER)
RADIO SEARCH	**Search for radio stations**
RADIO ON	**Radio**: To switch the radio on or off
ALARM ON	**Alarm**: To switch the buzzer off
SLEEP	**Alarm**: To switch off the alarm. After ten minutes the alarm will switch on again
0-9	**Number buttons:** 0 - 9
CLEAR	**Delete** : To delete last entry or clear programmed recording (TIMER)
TIMER ◷	**TIMER**: To make a manual TIMER programming or to alter or clear a programmed TIMER
MENU	**Menu** : To call up or end main menu
OK	**Store/Confirm**: To store or confirm entry
P +/− ▲▼	**Programme number**: To select a programme number up or down
P − ▼	**Select**: One line up
▲ P +	**Select**: One line down
⊿ +/− ◀▶	**Volume**: To regulate the volume
◀ ⊿ −	**Select**: Cursor left
+ ⊿ ▶	**Select**: Cursor right
🔇	**Volume off**: To switch the volume on or off
P◂P	**Previous programme number**: To select the previous programme number
PLAY ▶	**Playback** : To play a recorded cassette
◁◀	**Rewind** : During STOP and STANDBY: rewind, during PLAYBACK: reverse scanning
STOP ■	**Pause/Stop**: To stop the tape, except while a TIMER-recording is being made
▶▷	**Forward wind**: During STOP and STANDBY: forward wind, during PLAYBACK: forward scanning
INDEX ▶▏	**Index search**: In combination with
RECORD/OTR ●	**Record**: To record the programme selected
STILL ▶◀	**Still picture**: To stop the tape and show a still picture

Back of the set



EXT.1 **Scart socket**: To connect a satellite receiver, decoder, video recorder, etc.

ㄱ┌ **Aerial input socket**: To connect the aerial cable

Front of the set

⏼ **Power switch** : To switch off the set
Beware: When you switch the set off with the power switch, TIMER-recordings are not possible!

⏻ **Standby** : To switch off, interrupt a function, interrupt a programmed recording (TIMER)

P +/– **Programme number** : To select programme number up or down

◿ +/– **Volume**: To regulate the volume

◁◀ **Rewind** : During STOP and STANDBY: rewind, during PLAYBACK: reverse scanning

▶▷ **Forward wind**: During STOP and STANDBY: forward wind, during PLAYBACK: forward scanning

◉ **Record**: To record the programme selected

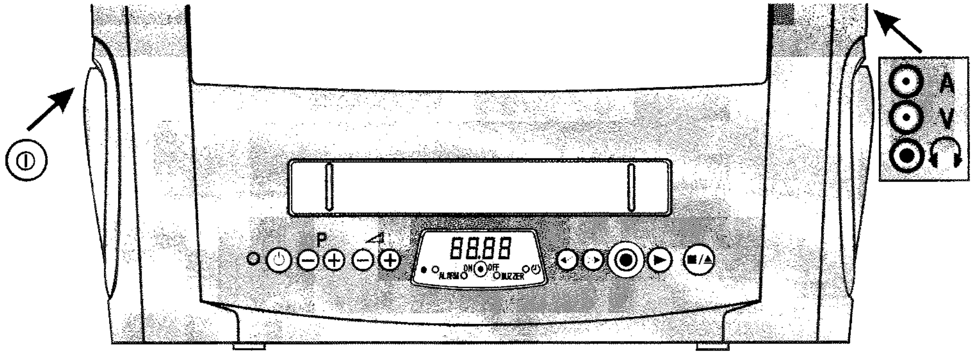
▶ **Playback** : To play a recorded cassette

■ **Pause/Stop, eject cassette**: To stop the tape and during STOP eject the cassette

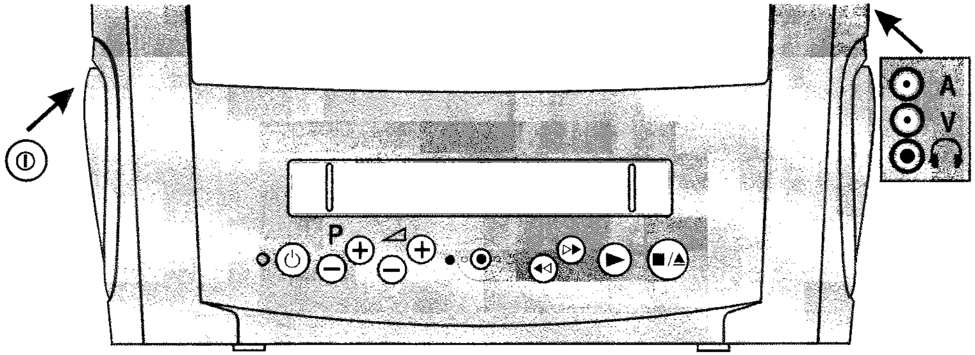
A **Audio input socket**

V **Video input socket** : To connect a camcorder or videogames

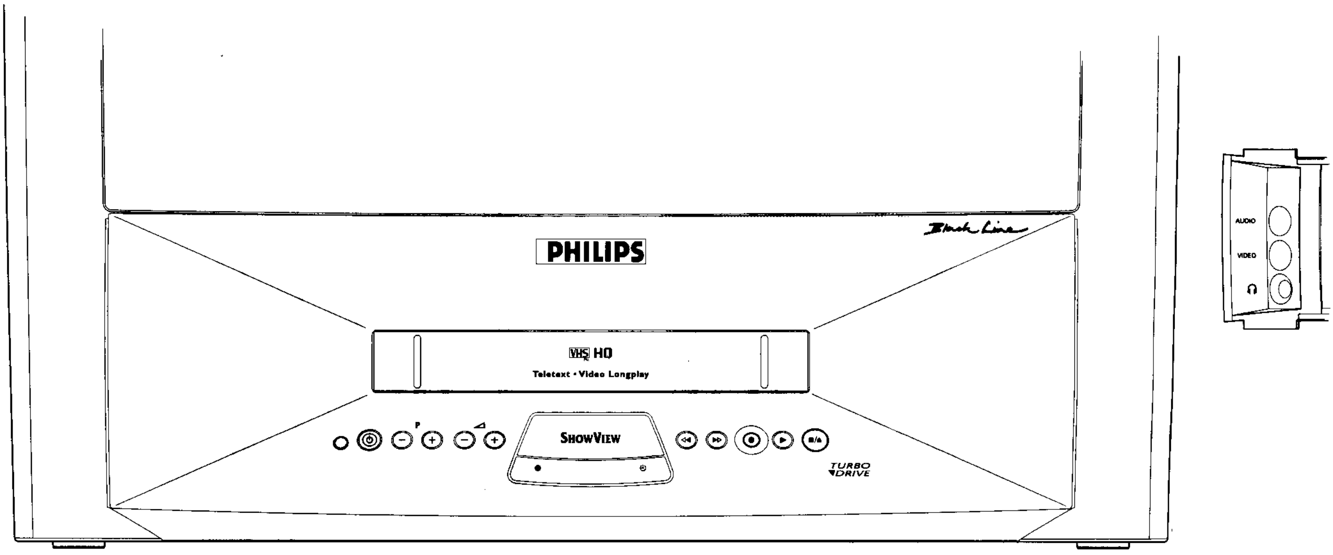
🎧 **Headphones socket**: To connect headphones



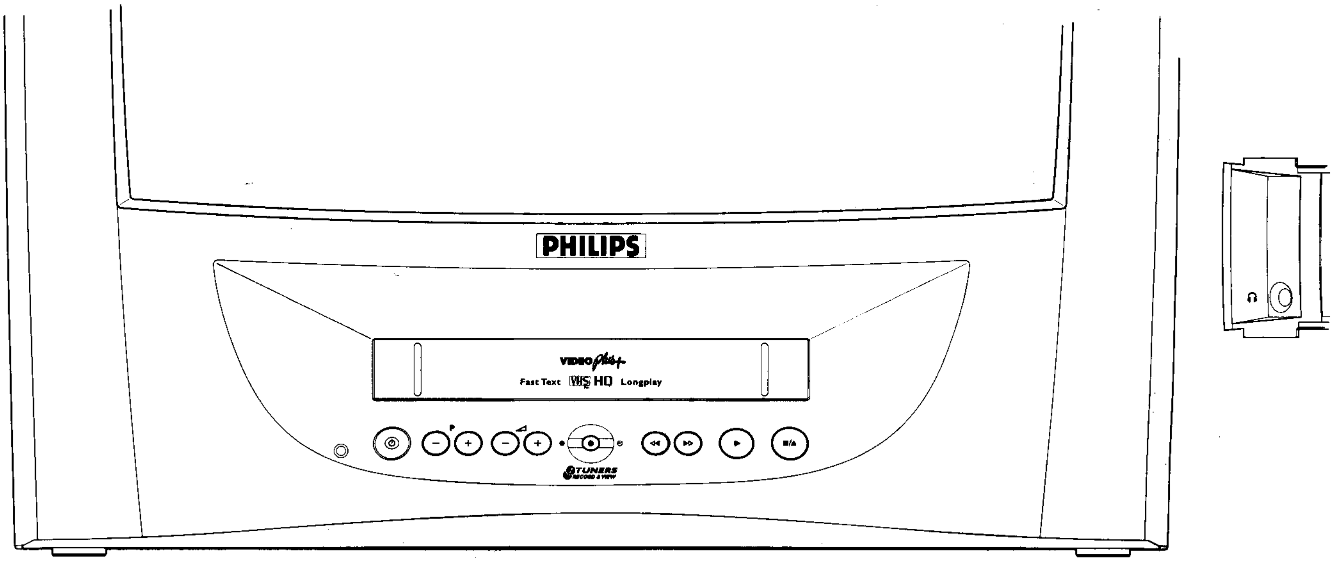
14PV320, 14PV340,
14PV347, 14PV325,
14PV327



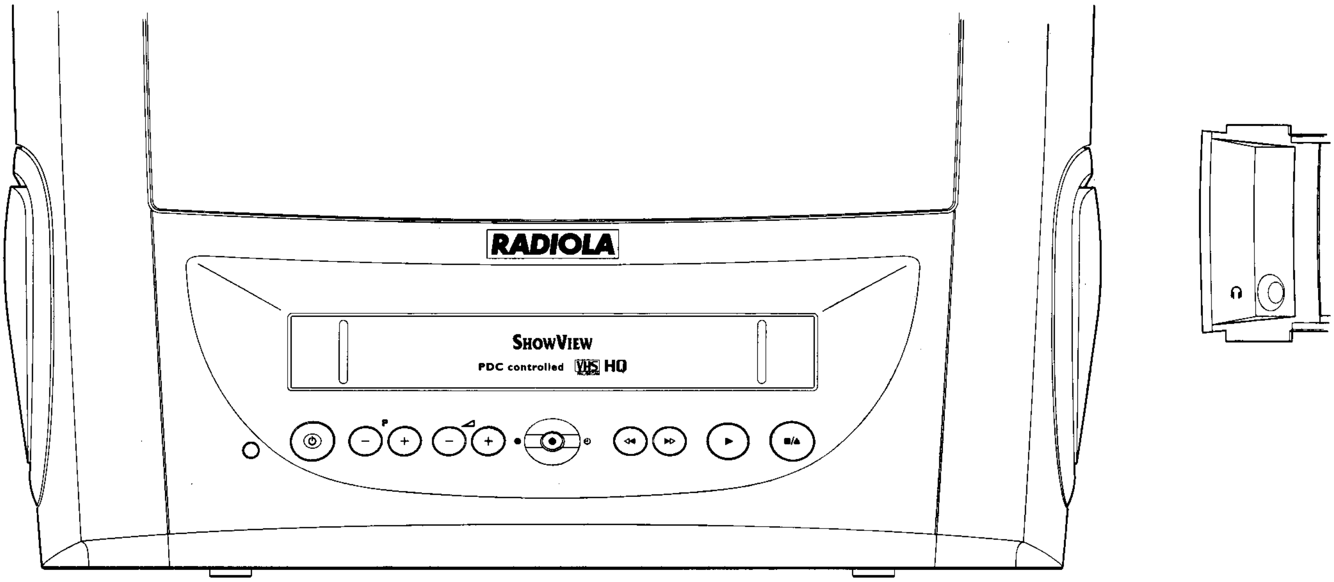
14PV210


PHILIPS
Black Line
VHS HQ
Teletext • Video Longplay
SHOWVIEW
TURBO DRIVE
AUDIO
VIDEO

21PV210, 21PV320, 25PV720


PHILIPS
VIDEO Plus+
Fast Text VHS HQ Longplay
TUNERS RECORD & VIEW

Nat. Brand 20",
20PV220


RADIOLA
SHOWVIEW
PDC controlled VHS HQ

Nat. Brand 14"

1. CONNECTING YOUR TV-VIDEO COMBI

Important for the United Kingdom

This apparatus is fitted with an approved moulded 13 Amp plug. To change a fuse in this type of plug proceed as follows:

1. Remove fuse cover and fuse.
2. Fix new fuse which should be a BS1362 5A, A.S.T.A. or BSI approved type.
3. Refit the fuse cover.

If the fitted plug is not suitable for your socket outlets, it should be cut off and an appropriate plug fitted in its place.
If the mains plug contains a fuse, this should have a value of 5A. If a plug without a fuse is used, the fuse at the distribution board should not be greater than 5A.

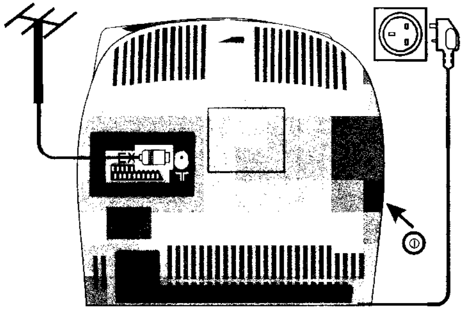
Note: * The severed plug must be destroyed to avoid a possible shock hazard should it be inserted into a 13A socket elsewhere.

How to connect a plug:
The wires in the mains lead are coloured in accordance with the following code:
BLUE - 'NEUTRAL' ('N')
BROWN - 'LIVE' ('L')

4. The BLUE wire must be connected to the terminal which is marked with the letter 'N' or coloured BLACK.
5. The BROWN wire must be connected to the terminal which is marked with the letter 'L' or coloured RED.
6. Do not connect either wires to the earth terminal in the plug which is marked with the letter 'E' or by the safety earth symbol ⏚ or coloured green or green-and-yellow.

Before replacing the plug cover, make certain that the cord grip is clamped over the sheath of the lead - not simply over the two wires.

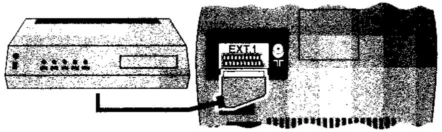
Connecting the cables



1. Insert the aerial plug into the ⊤ socket.
2. Insert the plug of the mains cable into the wall socket.
3. If the little red light at the front of the set is not alight, please switch on the set. The power switch ⏻ is located on the left side panel of the set.

Connecting a decoder or other equipment

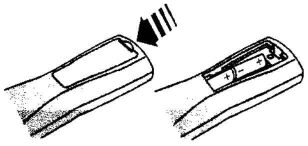
You can also connect additional equipment to the EXT.1 socket. For instance, a satellite receiver, decoder or camcorder.



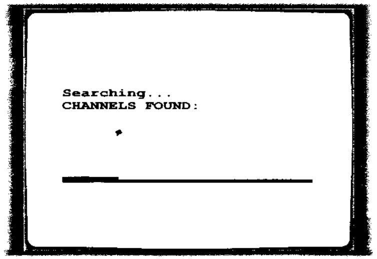
2. INSTALLING YOUR TV-VIDEO COMBI

Initial installation

1. Open up the battery compartment of your remote control and place the batteries in it as shown in the picture.



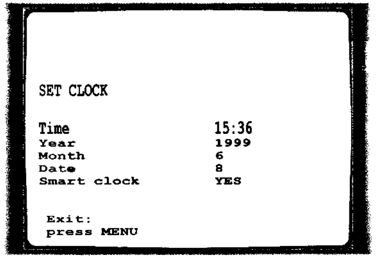
2. Close the battery compartment.
3. Confirm the picture on the TV screen with the OK button on the remote control.
4. Select the language for the on-screen display (OSD) with the ▲P+ or P–▼ button.
5. Confirm with the OK button.
6. Select the country of your residence with the ▲P+ or P–▼ button.
   If this country does not show up, select '`OTHER`'.
7. Confirm with the OK button.
8. If you have connected the aerial to the TV-VIDEO Combi, press the OK button.
   'Automatic TV channel search' starts. This picture will appear on the screen:



```
Searching...
CHANNELS FOUND:
```

Wait until all TV channels have been found. This can take several minutes.

☐ '`Time`', '`Year`', '`Month`', '`Date`' will appear on the TV screen.



```
SET CLOCK

Time            15:36
Year            1999
Month           6
Date            8
Smart clock     YES

 Exit:
 press MENU
```

9. Check if the TIME in line '`Time`' is correct. If required, change the time with the number buttons 0-9 on your remote control.
10. Confirm with the OK button.
11. Check '`Year`', '`Month`' and '`Date`' in the same way. Confirm each line with the OK button.
12. After you have confirmed the line '`Date`, the TV-VIDEO Combi will switch to standby.
    The initial installation is now complete.
    - If you have connected a decoder, you must install it as described in the next section.
    - If you have connected a satellite receiver, please read the section 'satellite receiver'.

Automatic clock and date setting (SMART CLOCK)

If a TV programme, which transmits TELETEXT, is stored with programme number '`P01`', time and date will be set automatically.

1. Select the line '`Smart clock`' with the menu buttons ▲P+ or P–▼.
2. Switch the function on with the menu buttons ◄⊿– or +⊿►.
   - Clock and date will automatically be adjusted to winter time and summer time.

Allocating a decoder

Some TV stations will send coded TV channels, that you can only watch when you use a decoder. You can connect such a decoder (descrambler) to your TV-VIDEO Combi. With the following function, the connected decoder will automatically be activated for the TV programme you want to watch.

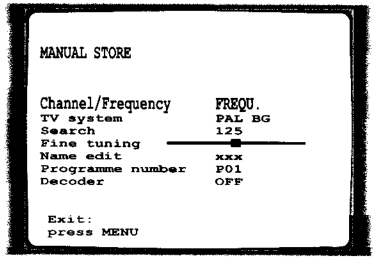
1 Choose the TV channel on which you wish to use the decoder with the [+⊿▶] or [◀⊿−] buttons on the TV-VIDEO Combi or the number buttons [0-9] on the remote control.

2 Press the [MENU] button on the remote control. The main menu will appear.

3 Select the line '`Installation`' with the [▲P+] or [P−▼] buton and confirm with the [+⊿▶] button.

4 Select the line '`Manual store`' with the [▲P+] or [P−▼] button and confirm with the [+⊿▶] button.

5 Select the line '`Decoder`' with the [▲P+] or [P−▼] button.



```
MANUAL STORE

Channel/Frequency      FREQU.
TV system              PAL BG
Search                 125
Fine tuning   ─────────■──────
Name edit              xxx
Programme number       P01
Decoder                OFF

 Exit:
 press MENU
```

6 Select function '`ON`' with the [◀⊿−] or [+⊿▶] button. When you select '`OFF`', the function will be switched off.

7 Confirm with the [OK] button.

8 To end, press the [MENU] button.
Your decoder has now been allocated to this TV channel.

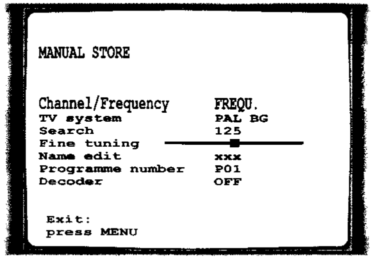
Manual TV channel search

In certain cases the 'Automatic TV channel search' may not be able to find all of the TV channels (e.g. coded TV channels). In that case, use this manual method to set the channels.

1 Press the [MENU] button on the remote control. The main menu will appear.

2 Select the line '`Installation`' with the [▲P+] or [P−▼] button and confirm with the [+⊿▶] button.

3 Select the line '`Manual store`' with the [▲P+] or [P−▼] button and confirm with the [+⊿▶] button.



```
MANUAL STORE

Channel/Frequency      FREQU.
TV system              PAL BG
Search                 125
Fine tuning   ─────────■──────
Name edit              xxx
Programme number       P01
Decoder                OFF

 Exit:
 press MENU
```

4 In the line '`Channel/Frequency`', select the display for:
'`FREQU.`': frequency
'`CH`': channel
'`C CH`': special channel

5 If you know the frequency or channel of the desired TV channel, you can enter the data in line '`Search`' with the digit buttons [0-9].

▷ If you don't know the frequency or channel of the TV channel of your choice, press the [+⊿▶] button to start the channel search.

6 In the line '`Programme number`' select the programme number you want e.g.: '`P01`', using the [◀⊿−] or [+⊿▶] button.

7 If you want to change the TV channel name, press the [+⊿▶] button in line '`Name edit`'.

☐ Select the character you want to change with the [◀⊿−] or the [+⊿▶] button. Change the character with the [▲P+] or the [P−▼] button. Select the next character in the same way.

☐ Keep pressing the [+⊿▶] button until the cursor disappears.

8 If you want to change the automatic tv channel setting, select the line '`Fine tuning`'.
With the [◀⊿−] or [+⊿▶] button you can vary the automatic tv channel setting. **Important:** This re-tuning is only necessary and useful in **special cases**, e.g.: when there are stripes on the picture with cable-TV systems.

9 Press the [OK] button to store the TV channel.

▷ If you want to search for further TV channels, start again at step [5].

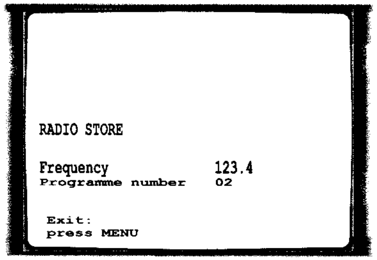
10 To end, press the [MENU] button.

Manual radio channel search

1 Press the [MENU] button. The main menu appears.

2 Select the line '`Installation`' with the [▲P+] or [P−▼] button and confirm with the [+⊿▶] button.

3 Select the line '`Radio store`' with the [▲P+] or [P−▼] button and confirm with the [+⊿▶] button.



```
RADIO STORE

Frequency              123.4
Programme number       02

 Exit:
 press MENU
```

4 If you know the frequency of the desired radio channel, you can enter the data in line '`Frequency`' with the digit buttons [0-9].

▷ If you don't know the frequency of the radio channel of your choice, press the [+⊿▶] button to start the channel search.

5 In the line '`Programme number`' select the programme number you want e.g.: '`02`', using the [◀⊿−] or [+⊿▶] button.

6 Press the [OK] button to store the radio channel.

▷ If you want to search for further radio channels, start again at step [4].

7 To end, press the [MENU] button.

Satellite receiver

You can receive channels from the satellite receiver via the scart socket [EXT.1].
To do this, select the channel number '`E1`' with the [P+/−▲▼] button. You will have to select the channels to be received by the satellite receiver on the receiver itself.

Automatic TV channel search

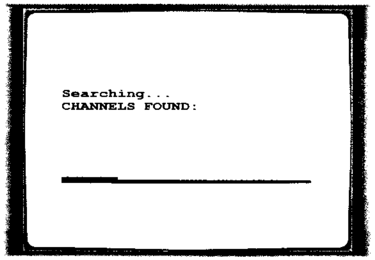
Your TV-VIDEO Combi will search for all TV channels.
If you want to start the automatic TV channel search again, then follow the instructions below.

1 Press the [MENU] button on the remote control. The main menu will appear.

2 Select the line '`Installation`' with the [▲P+] or [P−▼] button and confirm with the [+⊿▶] button.

3 Select the line '`Autostore`' with the [▲P+] or [P−▼] button.

4 Press the [+⊿▶] button. The 'Automatic TV channel search' starts.



```
Searching...
CHANNELS FOUND:
```

5 When the TV channel search is complete, '`Autostore ready`' will appear on the screen.

How to search for a TV channel manually, you can read in the section 'Manual TV channel search'.

▷ Automatic Channel Installation:
Some cable companies or broadcasters offer the possibility to install TV channels automatically with 'ACI'.
Information about the installation offered and how to select it, will appear on the screen.
This set will recognize and install TV channels with 'ACI' automatically.
TV channels will be stored from programme number 1 onward.
If 'ACI' cannot identify a TV channel, you can search for it using the method as described in the section 'Manual TV Channel Search'.

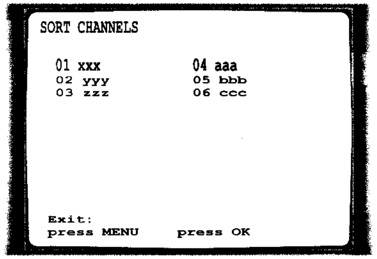
▷ Automatic Channel Installation ATS (automatic tuning system):
TV channels will be stored from programme number 1 onward.

Channel Number Allocation

1 Press the MENU button. The main menu appears.

2 Select the line '`Installation`' with the menu buttons ▲P+ or P−▼ and confirm with the menu button +◿▶.

3 Select the line '`Sort channels`' with the menu buttons ▲P+ or P−▼ and confirm with the menu button +◿▶.



```
SORT CHANNELS

 01 xxx            04 aaa
 02 yyy            05 bbb
 03 zzz            06 ccc



Exit:
press MENU        press OK
```

4 With the menu buttons ▲P+, P−▼, ◀◿− or +◿▶, select the TV channel to which you want to allocate a programme number and press the OK button.

5 With the menu buttons ▲P+, P−▼, ◀◿− or +◿▶, shift the TV channel to the programme number you wish to allocate to this TV channel and press the OK button.

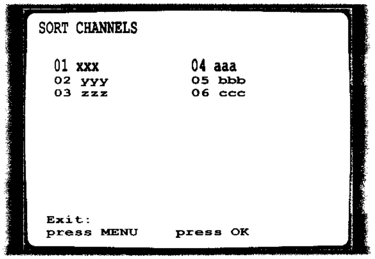
6 Repeat steps 4 to 5 until you have allocated a programme number to all the required TV channels.

Delete a TV Channel

1 Press the MENU button. The main menu appears.

2 Select the line '`Installation`' with the menu buttons ▲P+ or P−▼ and confirm with the menu button +◿▶.

3 Select the line '`Sort channels`' with the menu buttons ▲P+ or P−▼ and confirm with the menu button +◿▶.



```
SORT CHANNELS

 01 xxx            04 aaa
 02 yyy            05 bbb
 03 zzz            06 ccc



Exit:
press MENU        press OK
```

4 With the menu buttons ▲P+, P−▼, ◀◿− or +◿▶, select the TV channel you want to delete and press the OK button.

5 Repeat step 4, until you have deleted all the required TV channels.

Setting the language

You can select the language for the on-screen display (OSD).

1 Press the MENU button on the remote control. The main menu will appear.

2 Select the line '`Installation`' with the ▲P+ or P−▼ button and confirm with the +◿▶ button.

3 Select the line '`LANGUAGE`' and confirm with the +◿▶ button.

4 Select your language with the ▲P+ or P−▼ button and confirm with the OK button.

5 To end, press the MENU button.

Setting the country

To call up the specific settings for your country, you must install the country.

1 Press the MENU button on the remote control. The main menu will appear.

2 Select the line '`COUNTRY`' and confirm with the OK button.

3 Select the country you are in with the ▲P+ or P−▼ button. If your country doesn't show up, select '`OTHER`'.

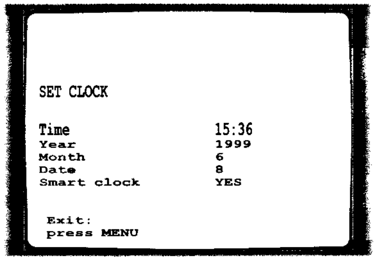
4 Confirm with the OK button.

5 To end, press the MENU button.

Setting the time and date

1 Press the MENU button on the remote control. The main menu will appear.

2 Select the line '`Set clock`' with the ▲P+ or P−▼ button and confirm with the +◿▶ button.



```
SET CLOCK

Time                    15:36
Year                    1999
Month                   6
Date                    8
Smart clock             YES

 Exit:
 press MENU
```

3 Check the time in line '`Time`'. If required, please change the time with the 0-9 buttons on the remote control.

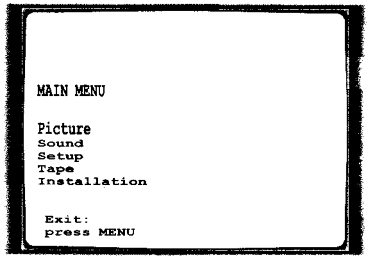
4 Check '`Year`', '`Month`' and '`Date`' in the same way. You can switch between entry fields with ▲P+ or P−▼ button. Confirm each entry with the OK button.

5 To end, press the MENU button.

3. IMPORTANT NOTES FOR OPERATION

SUMMARY OF USER GUIDE

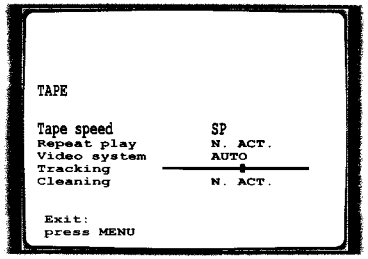
The OSD menu offers the following functions. More details on each can be found in the appropriate chapter.



MAIN MENU

Picture
Sound
Setup
Tape
Installation

Exit:
press MENU

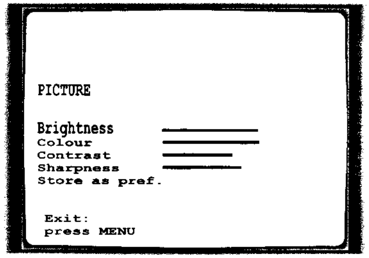


TAPE

Tape speed SP
Repeat play N. ACT.
Video system AUTO
Tracking
Cleaning N. ACT.

Exit:
press MENU

Chapter: 'PLAYBACK FUNCTIONS'

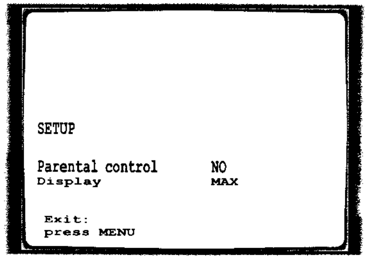


PICTURE

Brightness
Colour
Contrast
Sharpness
Store as pref.

Exit:
press MENU

Chapter: 'TV SET FUNCTIONS'



SETUP

Parental control NO
Display MAX

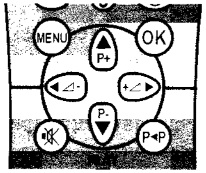
Exit:
press MENU

Chapter: 'ADDITIONAL FUNCTIONS'

User guide (OSD)

The OSD (On-screen display) shows the various functions in the form of a menu on the television screen. You can then choose the settings you require. There is a summary of the menus on this page. The main button functions are displayed in a help line along the bottom of the screen.

- ☐ **To call up the menu:** With the MENU button.
- ☐ **To select a line:** With the ◄⊿– or +⊿► button.
- ☐ **To enter or change your selection:** With the 0-9, ◄⊿– or +⊿► button.
- ☐ **To cancel:** With the MENU button.
- ☐ **To save or confirm:** With the OK button.
- ☐ **To close the menu:** With the MENU menu button.



- ☐ You can switch on with the STOP■ button, the 0-9 buttons or by putting in a cassette.

4. TV SET FUNCTIONS

Selecting a TV programme

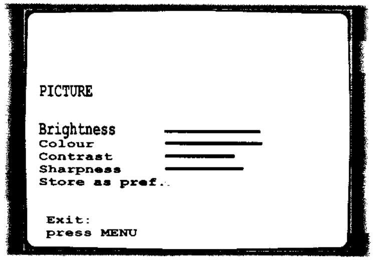
Select the required TV channel (=programme number) with the P+/–▲▼ button or with the digit buttons 0-9 on the remote control.

▷ If you don't know the programme number of the required TV channel:

1. Press the P+/–▲▼ button for more than 2 seconds. The TV channel list appears on the screen.
2. Select the required TV channel with the P+/–▲▼ button.
   After 1 second the TV-VIDEO Combi will switch to the selected programme number.

Picture settings

1. Press the MENU button. The main menu appears.
2. Select the line '`Picture`' with the menu buttons ▲P+ or P–▼ and confirm with the menu button +⊿►.



PICTURE

Brightness
Colour
Contrast
Sharpness
Store as pref..

Exit:
press MENU

3. Select the required line with the menu buttons ▲P+ or P–▼ and alter with the menu buttons ◄⊿– or +⊿►.

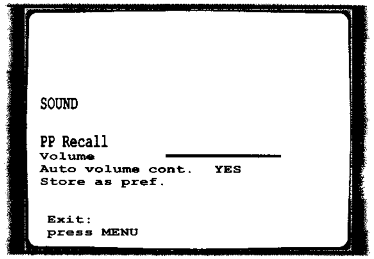
   ▷ To store this setting as a standard setting, select the line '`Personal`' with the menu buttons ▲P+ or P–▼ and confirm with the OK button.

Volume control

You can control the volume level with the ⊿+/–◄► button. If you want to mute the sound temporarily (e.g.: during a telephone call), press the 🔇 button on the remote control. When you press the 🔇 button again, the sound will return at its original volume level.

Sound settings

1. Press the MENU button. The main menu appears.
2. Select the line '`Sound`' with the ▲P+ or P–▼ button and confirm with the +⊿► button.



SOUND

PP Recall
Volume
Auto volume cont. YES
Store as pref.

Exit:
press MENU

3. Select the required line with the ▲P+ or P–▼ button and alter with the ◄⊿– or +⊿► button.

   ▷ To store this setting as a standard setting, select the line '`Personal`' with the ▲P+ or P–▼ button and confirm with the OK button.

   ▷ To call up the standard settings, select the line '`PP Recall`' with the ▲P+ or P–▼ button and confirm with the +⊿► button.

Automatic volume control (AUTO VOLUME CONTROL)

- ☐ Switch on '`Auto volume cont.`', to activate the automatic volume control. It minimises sudden changes in TV volume when commercial spots are transmitted.

5. RADIO FUNKTIONS

Switch on the radio with the RADIO ON button.

Selecting a radio channel

Select the required radio channel with the P+/– ▲▼ button or with the digit buttons 0-9 on the remote control.

Searching a radio channel

You can search for a radio channels that have not been stored, while you are listening to the radio.

1 Press the RADIO SEARCH button.
▷ The TV-VIDEO Combi will search for the next radio channel.

2 Repeat step 1 to search for the next radio channel.

Showing the frequency

☐ Press the OK button while you are listening to the radio. You will see the frequency of the radio channel you are listening to on the display.

6. PLAYBACK FUNCTIONS

Playing a cassette

1 Put a cassette into the cassette slot.

2 Press the PLAY ▶ button.

3 To stop, press the STOP ■ button.

4 To eject the cassette, press the ■ button.
▷ Some hired cassettes may have a poor picture or poor sound quality. This is not a fault in your machine. Please read 'Eliminating picture interference'.
▷ Some functions switch off automatically after a while (for example, pause, still picture, picture search). This helps to protect the cassette and avoids wasting power.

Playing NTSC cassettes

With this set you can play cassettes that have been recorded on another video recorder in the NTSC standard (for example, American cassettes).

▷ Some special features (for example, still picture) are not possible while you are playing an NTSC cassette.

Tape position indication

▷ Press the OK button to display the current tape position.

▷ To change the type of tape position display, proceed as follows:

1 During playback, press the MENU button.

2 Select the line '`Tape`' with the menu buttons ▲P+ or P–▼ and confirm with the OK button.

3 Select the line '`Tape counter`' with the menu buttons ▲P+ or P–▼.

4 With the menu buttons ◀⊿– or +⊿▶ select '`Time used`' to check the time used, or '`Time left`' to check the time left on the tape.

5 Confirm with the OK button.

Searching for tape position with the picture (picture search)

1 While a cassette is playing, press the ◀◀ (reverse) or ▶▶ (forward) button once or several times.

2 To stop at a certain picture, press the PLAY ▶ button.
▷ During picture search, the picture quality may not be so good and there will be no sound.

Still picture

1 Press the STILL ▶◀ button. A still picture will appear on the screen.

2 Each time you press STILL ▶◀ again, the picture will move on one step.

Searching for tape position without the picture (wind and rewind)

1 Stop the tape with the STOP ■ button.

2 Press the ◀◀ (reverse) or ▶▶ (forward) button.

3 To stop at a certain picture, press the STOP ■ button.

Instant View

With this function you can switch to picture search during wind and rewind.

1 If you hold the ◀◀ (rewind) or ▶▶ (wind) button during wind or rewind, you will switch to picture search.

2 When you release the button, the TV-VIDEO Combi will automatically switch back to rewind or wind.

Automatic search for a tape position (index search)

At the start of each recording, the TV-VIDEO Combi will write an index code on the tape.

1 Press the INDEX ▶◀ button. Press the ▶▶ button to select the next code mark or the ◀◀ button for the previous code mark.

2 When the TV-VIDEO Combi finds the code mark, it will automatically switch to play.

Picture interference

When the picture quality is poor when you play a cassette, please follow these instructions.

Tracking during playback

1. During playback, press the MENU button.
2. Select the line '`Tape`' with the menu buttons ▲P+ or P−▼ and confirm with the +◢▶ button.
3. Select the line '`Tracking`' with the menu buttons ▲P+ or P−▼.
4. Hold the menu buttons ◀◢− or +◢▶ until the playback quality is at its best.
5. Confirm with the OK button.
6. To end, press the MENU button. This setting will remain until you remove the cassette.

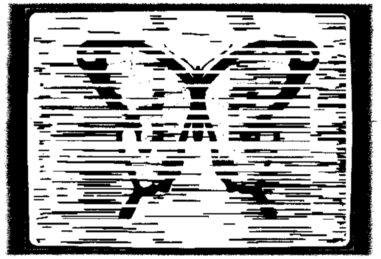
Tracking during still picture

If the still picture vibrates vertically, you can improve the still picture as follows:

1. During still picture, press the MENU button.
2. Select the line '`Tape`' with the ▲P+ button or P−▼ and confirm with the +◢▶ button.
3. Select the line '`Jitter`' with the ▲P+ or P−▼ button.
4. Hold the ◀◢− or +◢▶ button until the picture quality is at its best.
5. Confirm with the OK button.
6. To end, press the MENU button.
   ▷ Please note, however, that interference may still occur with poor quality cassettes.

Cleaning the video heads

If horizontal lines appear on the screen when you play a cassette, you should clean the video heads.



1. During playback, press the MENU button.
2. Select the line '`Tape`' with the menu buttons ▲P+ or P−▼ and confirm with the +◢▶ button.
3. Select the line '`Cleaning`' with the menu buttons ▲P+ or P−▼.
4. Press the OK button. '`CLEANING`' appears on the screen.
5. Wait a few seconds, until the message disappears and then press the MENU button.

7. MANUAL RECORDING

Use 'Manual Recording' to make a spontaneous recording (for example, a programme currently being shown).

☐ If you want to start and stop a recording manually, read the section: 'Recording without automatic switch-off'.

☐ If you want to start a recording manually but have it stopped automatically, read the section: 'Recording with automatic switch-off'.

☐ If you want a recording to be controlled automatically by a satellite receiver, read the section entitled 'Automatic recording from a satellite receiver'.

Recording without automatic switch-off

1. Insert a cassette.
2. Use the P+/−▲▼ button to select the programme number you want to record, for example, 'P01'.
   ▷ Programme number '`E1`' is provided for recording from external sources (via the EXT.1 scart socket).
3. To start recording, press the RECORD/OTR● button on the remote control or ◉ on the TV-VIDEO Combi.
4. Stop recording with the STOP■ button.
   ▷ During a recording you can only watch the current programme.
   ▷ To switch off the screen, press the STANDBY⏻ button.

Recording with automatic switch-off (OTR one-touch-recording)

1. Put a cassette in the machine.
2. Use the P+/−▲▼ button to select the programme number you want to record.
3. Press the RECORD/OTR● button on the remote control.
4. Press the RECORD/OTR● button again and again until the display on the TV-VIDEO Combi shows the desired end time or length of the recording.
   ▷ To cancel this information, press the CLEAR button.

Protecting your recordings

So that you don't accidentally delete an important recording, remove the special tab on the narrow side of the cassette with a screwdriver or slide the special tab to the left. Later, if you no longer want to protect your recording, you can seal the gap again with sticky tape or slide the special tab to the right.

Auto-assembling

You can use the auto-assembling function to join individual recordings without any major picture disturbance between them.

1. While the cassette is playing, search for the correct position on the tape.
2. Stop the cassette by pressing the STOP■ button. '`Pause`' will appear on the TV screen.
3. Now start recording as usual by pressing the RECORD/OTR● button on the remote control.

Selecting the recording speed (SP or LP)

You can reduce the recording speed by half. This makes it possible to record, for example, eight-hours instead of four-hours on an 'E240' (four-hour) cassette.

1. Press the MENU button. The main menu appears.
2. Select the line '`Tape`' with the ▲P+ or P−▼ button, and confirm with the +◢▶ button.
3. Select the line '`Tape speed`' with the ▲P+ or P−▼ button, and confirm with the +◢▶ button.
4. Select the required recording speed with the ◀◢− or +◢▶ button.
   ▷ '`LP`': **L**ong **P**lay = half recording speed (double recording time).
   '`SP`': **S**tandard **P**lay = normal recording speed.
   ▷ The picture quality will be adversely affected when recording at half recording speed ('LP').
   ▷ For playback, the correct recording speed will automatically be selected.
5. Confirm with the OK button.
6. To end, press the MENU button.

8. PROGRAMMED RECORDING (TIMER)

Use programmed recording to automatically start and stop a recording at a later date.

To make a programmed recording, your TV-VIDEO Combi needs to know:

* the date you want to make the recording;
* the programme number for the TV channel you want to record;
* the start and stop time of the recording;
* whether you want to use VPS or PDC;
* the recording speed (SP/LP).

The TV-VIDEO Combi stores all the information in a TIMER block. You can programme up to 6 TIMER blocks a month in advance.

'VPS' (Video Programming System) and 'PDC' (Programme Delivery Control)

With 'VPS and PDC', the TV station controls the start time and the length of the recording. This means that the TV-VIDEO Combi switches itself on and off at the **right time** even if a TV programme you want to record begins earlier or finishes later than expected.
Usually the start time is the **same** as the VPS or PDC time. But if your TV guide gives a VPS or PDC time which is different to the programme's start time (for example, 20.15 and VPS 20.14), you must enter '20.14' as the start time.
If you want to programme a time that is different from the VPS or PDC time, you must switch off VPS or PDC.

Programming a recording (with 'VIDEOplus')

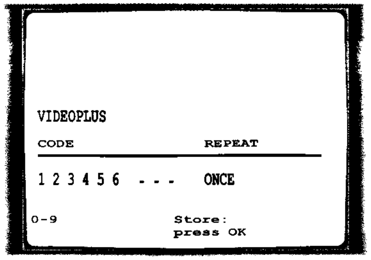
All the information required for a programming is contained in the PlusCode-programming number.

VIDEOPlus®

1 Press the TIMER⏻ button on the remote control.

2 Select the line '`Videoplus`' with the menu buttons ▲P+ or P–▼ and confirm with the +◁▶ button.

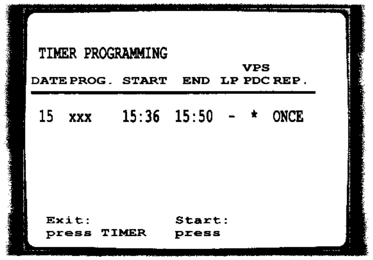
3 Enter the entire PlusCode-programming number (up to 9 digits) printed in your TV guide next to the start time of a TV programme.
For example, 5-234-89 or 5 234 89
Enter 523489 for the PlusCode-programming number.
If you make a mistake, you can clear your instructions with the CLEAR button.



```
VIDEOPLUS
CODE                REPEAT
1 2 3 4 5 6  - - -  ONCE
0-9                 Store:
                    press OK
```

4 In line '`Tape`' select daily or weekly programming with the ◀◁– or +◁▶ button.
'`Mo-Fr`': recordings every day from Monday to Friday.
'`Mo-Su`': recordings every day from Monday to Sunday.
'`WEEKL.`': recordings every week on the same day of the week.

5 Confirm with the OK button. Your programming details will then appear on the TV screen.



```
TIMER PROGRAMMING
                                   VPS
DATE PROG.  START   END   LP PDC REP.
15   xxx    15:36   15:50  -   *  ONCE

Exit:               Start:
press TIMER         press
```

▷ If VIDEOPlus+ does not recognise the TV channel, '`E1`' will appear on the TV screen. Instead of '`E1`', you can select the programme number you want with the number buttons 0-9 and confirm with the OK button.

▷ If '`Code error`' appears on the TV screen, this means you entered an incorrect PlusCode number or the incorrect date. Correct your instructions or end with the SV/V+ button.

▷ If '`Daily error`' appears on the TV screen, the date was incorrectly entered. Daily programming can only be used for recordings to be made from Monday to Friday.

▷ Under '`VPS/PDC`', use the ▲P+ or P–▼ button to switch 'VPS or PDC' on or off.

▷ Under '`LP`', use the ▲P+ or P–▼ button to select the recording speed 'SP' or 'LP'.

▷ If the message '`Press STOP to start recording`' appears on the TV screen, press the STOP■ button.
A TIMER recording will only function, if the set is not used for other TV-VIDEO Combi functions (e.g. playback).

▷ The TIMER lamp on the front of the set lights up when one or more of the TIMER blocks are occupied.

▷ If the end of the cassette is reached during a recording, the TV-VIDEO Combi automatically ejects the cassette.

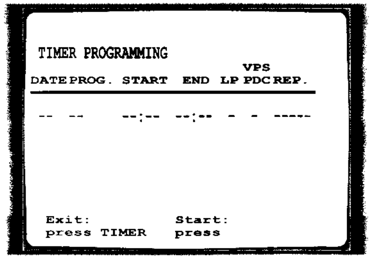
▷ If you forget to load a cassette, '`Timer collision - no cassette`' will appear.

▷ If you inserted a cassette with erase protection when you want to start a recording, the cassette will be ejected.

Programming a recording (without 'VIDEOPlus')

1 Press the SV/V+ button on the remote control.

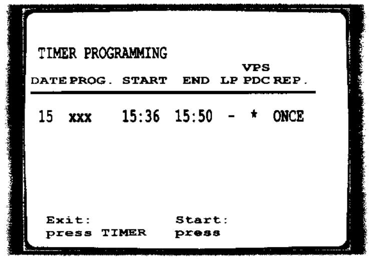
2 Select the line '`Timer programmed`' with the menu buttons ▲P+ or P–▼ and confirm with the +◁▶ button.



```
TIMER PROGRAMMING
                                   VPS
DATE PROG.  START   END   LP PDC REP.
--   --     --:--   --:--  -   -  -----

Exit:               Start:
press TIMER         press
```

3 Select a free TIMER block with the P+/–▲▼ button. Press the OK button.



```
TIMER PROGRAMMING
                                   VPS
DATE PROG.  START   END   LP PDC REP.
15   xxx    15:36   15:50  -   *  ONCE

Exit:               Start:
press TIMER         press
```

4 Select the entry field with the ◀◁– or +◁▶ button.

5 Enter information with the menu buttons ▲P+ or P–▼ or with the digit buttons 0-9.

▷ Under '`REP.`', use the ▲P+ or P–▼ button to select daily or weekly programming.
'`Mo-Fr`': recordings every day from Monday to Friday.
'`Mo-Su`': recordings every day from Monday to Sunday.
'`WEEKL.`': recordings every week on the same day of the week.

▷ Under '`VPS/PDC`', use the ▲P+ or P–▼ button to switch 'VPS or PDC' on or off.

▷ Under '`LP`', use the ▲P+ or P–▼ button to select the recording speed 'SP' or 'LP'.

6 Confirm with the OK button when the information is correct.

▷ The programming information has been stored in a TIMER block.

7 To end, press the TIMER⏻ button.

8 Make sure that the cassette you have put in can be recorded on.

9. ADDITIONAL FUNCTIONS

How to check or change a TIMER

1 Press the TIMER⏻ button on the remote control.

2 Select the line '**Timer programmed**' with the menu buttons ▲P+ or P−▼ and confirm with the +⊿► button.

3 Select the TIMER you want to check or change with the ▲P+ or P−▼ button and confirm with the OK button.

4 Select the entry field with the ◄⊿− or +⊿► button.

5 Change any information with the ▲P+ or P−▼ button or with the 0-9 buttons.

ⓘ Under '**LP**', use the ▲P+ or P−▼ button to select the recording speed 'SP' or 'LP'.

6 Confirm with the OK button.

7 To end, press the TIMER⏻ button.

8 Make sure that the cassette you have put in can be recorded on.

How to clear a TIMER

1 Press the TIMER⏻ button on the remote control.

2 Select the line '**Timer list**' with the menu buttons ▲P+ or P−▼ and confirm with the +⊿► button.

3 Select the TIMER you want to clear with the menu buttons ▲P+ or P−▼.

4 Press the CLEAR button.

5 Confirm with the OK button.

6 Switch off with the TIMER⏻ button.

How to read TELETEXT

☐ Press the TELETEXT⊜ button to switch the TXT decoder on and off. The TV-VIDEO Combi is now receiving the TXT of the TV channel currently selected.

☐ To store the current page, press the OK button. The next time you call up TELETEXT, you will automatically turn to this page.

☐ If you want to select an other page, type in the number of the page with the digit buttons 0-9.

Extra TELETEXT functions

To use the extra TELETEXT functions, press the MENU button, when you are in TELETEXT.

☐ To enlarge the print, select the symbol '⊕' and confirm with the OK button.

☐ To switch off the TELETEXT decoder temporarily, select the symbol '⊠' and confirm with the OK button.

☐ To call up a TELETEXT sub-page:

  1 Select the symbol '**/oo**' and confirm with the OK button.

  2 Enter the page number of the sub-page with the 0-9 -buttons (for example: 0123).

☐ To call up concealed information, select the symbol '⊡' and confirm with the OK button.

☐ To stop the pages from being turned over, select the symbol '⊞' and confirm with the OK button.

☐ To stop the pages from being turned over, select the symbol '⊕' and confirm with the OK button.

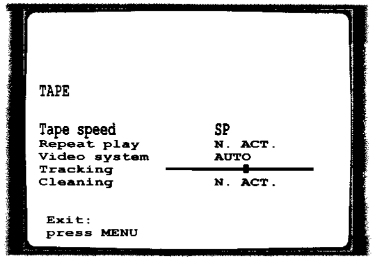
- To show TELETEXT transparently, select the symbol '◪' and confirm with the OK button.

Changing the TV system

If you play back recordings made on a different kind of tape (for example, NTSC standard), the automatic TV system switch-over may lead to colour interferences. You can switch off the 'automatic TV system switch-over' as follows.

1 Press the MENU button. The main menu appears.

2 Select the line '**Tape**' with the ▲P+ or P−▼ button and confirm with the +⊿► button.



TAPE

Tape speed SP
Repeat play N. ACT.
Video system AUTO
Tracking
Cleaning N. ACT.

Exit:
press MENU

3 In the line '**System**' select the required TV system with the menu buttons ◄⊿− or +⊿►.

4 Confirm with the OK button.

5 To end, press the MENU button.

ⓘ If colour interference still occurs, you can switch to '**BW**' (black and white) in line '**System**'.

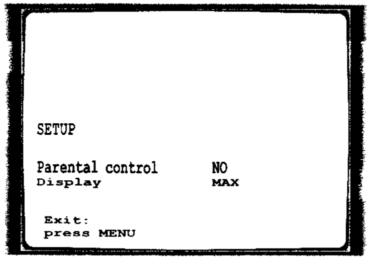
Parental control

This function will prevent unauthorised use of your TV-VIDEO Combi. All button-functions will be locked.

ⓘ You can make programmed recordings while the parental control is on.

1 Press the MENU button. The main menu appears.

2 Select the line '**Setup**' with the ▲P+ or P−▼ button and confirm with the +⊿► button.



SETUP

Parental control NO
Display MAX

Exit:
press MENU

3 In the line '**Parental control**' select '**ON**' with the ◄⊿– or +⊿► button.

4 Confirm with the OK button.

5 To end, press the MENU button. Keep the remote control in a safe place.

6 If you want to switch off the parental control, select '**OFF**' in line '**Parental control**'.

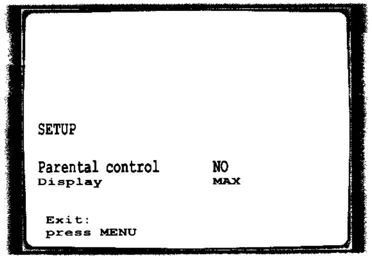
ⓘ If a button is pressed with activated parental control, 'σ‑' will appear in the display.

Switching the On-screen display (OSD) on or off

You can switch the On Screen Display of the current operating information on or off.

1 Press the MENU button. The main menu appears.

2 Select the line '**Setup**' with the menu buttons ▲P+ or P–▼ and confirm with the +⊿► button.



```
SETUP

Parental control      NO
Display               MAX

 Exit:
 press MENU
```

3 Select the line '**Display**' with the menu buttons ▲P+ or P–▼.

4 Select one of the options indicated with the menu buttons +⊿► or ◄⊿–.
'**MAX**': OSD appears for a few seconds each time an operating mode is selected and then disappears.
'**MIN**': OSD is minimised.
'**PROGR.**': the programme number is constantly indicated.
'**COUNTER**': the counter is constantly indicated.

5 Confirm with the OK button.

6 To end, press the MENU button.

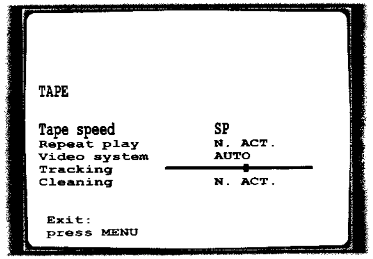
ⓘ With the OK button you can superimpose the On Screen Display of current operating mode on the TV screen.

Continuous playback

You can automatically play a cassette again and again. When the end of the tape or the recording has been reached, it will rewind and start again.

1 Press the MENU button. The main menu appears.

2 Select the line '**Tape**' with the menu buttons ▲P+ or P–▼. Confirm with the menu buton +⊿►.



```
TAPE

Tape speed            SP
Repeat play           N. ACT.
Video system          AUTO
Tracking         ─────┼─────
Cleaning              N. ACT.

 Exit:
 press MENU
```

3 Select the line '**Repeat play**' with the menu buttons ▲P+ or P–▼.

4 Select '**ON**' with the menu buttons ◄⊿– or +⊿►. If you select '**OFF**', the function will be switched off.

5 Confirm with the OK button.

6 Press the MENU button.

Switch off function (SLEEP TIMER)

You can programme your set to switch off after a predetermined period.

1 In the menu '**Setup**', select the line '**Sleep timer**'.

2 Determine the time left until switch off in 15 minutes intervals.
When you set the time to '0' with the CLEAR button the sleep timer is switched off.

3 Confirm with the OK button.

Switch on function (WAKE-UP TIMER)

You can programme your set to switch on at a predetermined time.

1 Press the TIMER⏻ button on the remote control.

2 Select line '**Wake-up timer**' with the ▲P+ or P–▼ button and confirm with the +⊿► button.

3 Wählen Sie mit der Taste ▲P+ oder P–▼ die Art des Timers.
'**TV**': Wake up with TV set.
'**RADIO**': Wake up with radio.
'**BUZZER**': Wake up with beep.

4 Select the entry field with the ◄⊿– or +⊿► button.

5 Enter the information with the ▲P+ or P–▼ button or with the number buttons 0-9.

6 In the line '**ON**', switch the function on or off.

7 Press the OK button.

C. LIST OF SIGNAL ABBREVIATIONS

Signal	Description	Circuit																										
+5TVBS	+5V for TVB, switched																							AF2				
12A	**+12V analog**						AL	VS				PS										HPAV	AP	AF				
12A2	+12V analog, for front audio buffer																					HPAV						
14A	**+14V analog**			SF							PS1	PS							SF1									
14M1	+14V for loading- and headmotor	AIO1				DE					PS1	PS																
17_14M1	**Capstan motor supply, Hi**										PS1																	
17_14M2	Capstan motor supply, Hi											PS																
190V	**Supply for RGB power amplifier**													PT														
33A	+33V for tuner tuning voltage										PS1	PS			TU1	TU2												
3V3	**+3.3V supply for TXT-IC (Painter)**										PS1										COTV							
5A1	+5V supply for audio processing																								AF2			
5AD	**+5V supply after stabilisation**										PS1	PS																
5AS	+5V analog, switched after fuse 1151											PS				TU2							AP	AF				
5AS2	**+5V analog, switched after fuse 1153**				CVB			VS	VSEC	HA		PS																
5DS	+5V digital, switched	AIO1				DE					PS1	PS						IO_1	SF1		COTV		AP		AF2			
5SE	**+5V supply for SECAM**								VSEC																			
5STBY	+5V supply permanently	AIO1	AIO2		CVB						PS1	PS						IO_1		AMP	COTV				AF2		ACO	KEY
5STBY2	**+5V supply permanently after coil 5901**		AIO2																									
5STBY3	+5V supply permanently after coil 5903		AIO2																									
5TVBS	**+5V supply for TVB, switched**			SF							PS1				TU1			IO_1										
5VS1	+5V supply for signal processing							VS																				
5VS2	**+5V supply for signal processing**							VS																				
5VSTBY	+5V permanent	AIO1																										
7NEG	**-7V supply**			SF							PS1							IO_1	SF1									
7NEGESD	-7V for ESD protection																	IO_1										
8A	**+8V Analog**																						AP					
8SC1	Scart 1 pin 8 output																	IO_1			COTV							
8TVB	**+8V supply on TVB**										PS1				TU1		TV	IO_1							AF2		ACO	
8TVB1	+8V supply on TVB after 5205																TV				COTV							
8TVB2	**+8V supply on TVB after 5706**														TU1													
9_14M2	Capstan motor supply, switched					DE						PS																
9M2	**Capstan motor supply, low**										PS1	PS																
9V	+9V aupply for radio display										PS1	PS																
A0...A19	**Adress lines**		AIO2																									
ABS	Automatic black current stabilisation													PT														
ABS_CRT	**Automatic black current stabilisation**																TV											
ADCO	Centre audio out from Dolby decoder																								AF2	DOSCD	ACO	
ADSO	**Surround audio out from Dolby decoder**																								AF2	DOSCD	ACO	
AE1L	Audio out left																	IO_1						AF				
AE1R	**Audio out right**																	IO_1						AF				
AEH1/2	Audio erase head																											
AFEL	**Audio from frontend, left**																						AP	AF				
AFER	Audio from frontend, right																						AP	AF				

Signal	Description	Circuit																										
AFRL	**Audio left from Front connector**						AL	VS														HPAV		AF				
AFRR	Audio right from front connector						AL	VS														HPAV		AF				
AFV1	**Audio from frontend 1**														TU1			IO_1	SF1						AF2			
AFV2	Audio from frontend 2															TU2							AP	AF				
AGC1	**Automatic gain control, tuner 1**														TU1						COTV							
AH1/2/C	Audio heads																											
AL0	**Audio output left**																								AF2			
ALO	Audio left out																	IO_1	SF1					AF				
AMLP	**Audio mono playback**						AL																	AF				
AMLR	Audio mono record						AL																	AF				
AMT	**Audio mute**	AIO1																		AMP	COTV							
ANODE	Picture tube anode													PT														
APH	**Playback audio from head**						AL																					
AQUADAG	Tube ground												LS	PT														
AR0	**Audio output right**																								AF2			
ARCLO	Audio rear cinch left out																								AF2	DOSCD	ACO	
ARCRO	**Audio rear cinch right out**																								AF2	DOSCD	ACO	
ARH	Audio record to head						AL																					
ASCLI_ASCI	**Audio scart left in/audio scart in**						AL											IO_1	SF1					AF	AF2			
ASCLI2	Audio left in from scart 2																					HPAV				DOSCD		
ASCLO	**Audio output from scart 1, left**																								AF2			
ASCRI	Audio scart right in																								AF2			
ASCRI_AFR	**Audio scart right in/Audio front**						AL											IO_1	SF1					AF				
ASCRI2	Audio scart left in/audio scart in																					HPAV				DOSCD		
ASCRO	**Audio output from scart 1, right**																								AF2			
ASTB	Audio standby																			AMP	COTV							
AUL	**Audio left**																		SF1	AMP								
AVSO	Audio view select out																		SF1									
AVSOL	**Audio view select out left**			SF																								
AVSOR	Audio view select out right			SF															SF1									
BCI	**Beam current information**												LS				TV											
BLSC	Blanking pulse RGB loopthrough																TV	IO_1										
BLUE	**Blue signal from scart**													PT			TV	IO_1										
BLUE_CRT	Blue signal to CRT panel																TV											
BTXT	**Blue signal from teletext**																TV				COTV							
CAGC	Chroma Automatic gain control	AIO1						VS																				
CAP	**Capstan control voltage**	AIO1				DE																						
CKDET	Colour killer detection	AIO1						VS																				
concrt_fg	**Picture tube ground**													PT														
concrt_g1	Picture tube grid 1													PT														
concrt_g2	**Picture tube grid 2**													PT														
concrt_gnd	Picture tube ground													PT														
concrt_h	**Tube heater ground**													PT														
concrt_ha	Tube heater													PT														

Signal	Description	Circuit																										
concrt_kb	**Tube kathode blue**													**PT**														
concrt_kg	Tube kathode green													PT														
concrt_kr	**Tube kathode red**													**PT**														
CPRV	Chrominance PAL record							VS		HA																		
CREV	**Capstan reverse**	**AIO1**				**DE**																						
CROT	Colour rotation on/off	AIO1						VS																				
CSCP	**Colour phase switching for LP feature mode**	**AIO1**						**VS**																				
CSI	Colour system information	AIO1							VSEC																			
CSP	**Chrominance secam playback**							**VS**	**VSEC**																			
CSRV	Chrominance secam record								VSEC	HA																		
CSW	**8V/14V switching for capstan motor**		**AIO2**									**PS**																
CSYNC	Composite sync pulse	AIO1						VS	VSEC																			
CSYNC2	**Composite sync pulse**							**VS**		**HA**																		
CTL1/2	Control track signal																											
D0-7	**Data lines**																											
DEG1/2	Degaussing													PT														
DISDIM	**Display-Dimmer**	**AIO1**										**PS**																
DISSUP	Display supply	AIO1										PS																KEY
DRUM	**Head wheel control**	**AIO1**				**DE**																						
EHT	High tension												LS															
EHT_PROT	**High tension protection**												**LS**				TV											
ENVC	Envelope comparator signal	AIO1								HA																		
EWDR	**East/West drive**												**LS**				**TV**											
FFP	Feature frame pulse	AIO1						VS																				
FGD	**Capstan tacho pulse digital**	**AIO1**				DE																						
FMPV	FM video playback							VS	VSEC	HA																		
FMRV	**FM video record**							**VS**		**HA**																		
FOCUS	Focus control signal												LS															
FSC	**Colour subcarrier**							VS	VSEC																			
G2 SCREEN	Grid 2 screen												LS															
GND	**Ground**																	IO_1			COTV				AF2		ACO	
GNDA	Ground analog																					HPAV						
GNDAF	**Ground analog AF**						AL	VS																AF				
GNDAIN	Ground analog in																					HPAV						
GNDAL	**Ground analog AL**						**AL**																					
GNDAP	Ground analog AP			SF														IO_1		AMP				AF		DOSCD		
GNDAP2	**Ground analog AP**																						**AP**		**AF2**		**ACO**	
GNDAU	Ground audio										PS1									AMP		HPAV						
GNDD	**Ground digital**	**AIO1**	**AIO2**		**CVB**	**DE**						**PS**																**KEY**
GNDEO	Ground erase oscillator						AL																					
GNDFV2	**Ground frontend 2**				**CVB**		**AL**					**PS**				**TU2**							**AP**					
GNDHA	Ground analog HA									HA														AF				
GNDHOT	**Primary ground**										**PS1**																	
GNDIF	Ground intermediate frequency														TU1													

Signal	Description	Circuit																										
GNDLOT	**Ground Line output transformer**												**LS**	**PT**														
GNDM	Ground capstan motor										PS1	PS																
GNDM1	**Ground loading- and headmotor**	**AIO1**				**DE**						**PS**																
GNDM2	Ground capstan motor					DE						PS																
GNDSF	**Ground analog SF**																		**SF1**	**AMP**								
GNDT	Ground analog TV																TV											
GNDTV	**Ground analog TV**										**PS1**	**PS**	**LS**	**PT**			**TV**	**IO_1**								**DOSCD**		
GNDTV2-4	Ground analog TV														TU1		TV											
GNDTXT	**Ground teletext**										**PS1**										**COTV**							
GNDV	Ground video																					HPAV						
GNDVFR	**Ground front video**																					**HPAV**						
GNDVS	Ground signal electronics							VS	VSEC															AF				
GREEN	**Green signal from scart**													**PT**			**TV**	**IO_1**										
GREEN_CRT	Green signal to CRT panel																TV											
GTXT	**Green signal from teletext**																**TV**				**COTV**							
HDEF1/2	Horizontal deflection												LS															
HDR	**Horizontal drive**												**LS**				**TV**											
HEATER	Heater voltage												LS	PT														
HFB	**Horizontal flyback**												**LS**				**TV**				**COTV**							
HP2	Head pulse audio	AIO1																						AF				
IBASS	**Bass regulating signal**			**SF**															**SF1**		**COTV**							
ICLKRESET	Reset for clock device, active low		AIO2		CVB																							
ILED	**LED-tower supply**	**AIO1**																										
INIT	Deck switch	AIO1																										
IRAL	**Inverse Record Audio Linear**	**AIO1**					**AL**																					
IREV	Dubbing oscillator on/off	AIO1								HA																		
ISTBY	**Inverse stand by**	**AIO1**									**PS1**	**PS**									**COTV**							
ISWS	Video-FM mute	AIO1								HA																		
ITREBLE	**Treble regulating signal**			**SF**															**SF1**		**COTV**							
ITXTINTCO	Teletext interrupt to controller, inverted	AIO1																			COTV							
IWIND	**Control pulse amplification low**	**AIO1**				**DE**																						
K1/2	Key sensing	AIO1	AIO2																									KEY
KBLUE	**Kathode blue**													**PT**														
KGREEN	Kathode green													PT														
KRED	**Kathode red**													**PT**														
LEFT	Left channel from FM radio			SF																								
LH1/2/C	**Long play heads**																											
LL	Line in left																			AMP		HPAV						
LR	**Line in right**																			**AMP**		**HPAV**						
LRD	Rote LED	AIO1																										KEY
LSPL	**Loudspeaker left**			**SF**														**IO_1**		**AMP**					**AF2**			
LSPR	Loudspeaker right			SF														IO_1		AMP					AF2			
MAINSOFF	**Antiplop at mains off**										**PS1**									**AMP**								
MEH1/2	Main erase head						**AL**																					

Signal	Description	Circuit																										
MNT1	**Sound filter switch**														**TU1**						**COTV**							
MTA	Audio mute	AIO1					AL																					
MUTE	**Audio mute**																								**AF2**		**ACO**	
MUTE_PST	Mute/pseudo stereo			SF														IO_1			COTV							
OS	**Ausganswahl**		**AIO2**					**VS**																				
PBV	Playback Video	AIO1							VSEC																			
PG_FG	**Head wheel position/-speed**	**AIO1**				**DE**																						
PSS1	PAL/SECAM switch, tuner 1														TU1						COTV							
RAB	**Radio buzzer**			**SF**															**SF1**		**COTV**							
RAD	Radio			SF															SF1		COTV							
RCLK_MNT2	**FM radio clock/sound filter switch**	**AIO1**	**AIO2**													**TU2**												
RDATA_PSS2	FM radio data/PAL-SECAM switch, tuner 2	AIO1	AIO2													TU2												
RECP	**Record protection**	**AIO1**																										
RED	Red signal from scart													PT			TV	IO_1										
RED_CRT	**Red signal to CRT panel**																**TV**											
REMOTE	Signal from remote control receiver	AIO1																										
RGBON	**RGB input selection**																**TV**				**COTV**							
RIGHT	Right channel from FM radio			SF																								
RL	**Record LED control**	**AIO1**																										**KEY**
RMA	Record mute audio	AIO1																						AF				
RMS_AFC2	**Radio stereo indication/AFC tuner 2**	**AIO1**														**TU2**												
RTXT	Red signal from teletext																TV				COTV							
RWE_SB1_2	**Radio Write Enable/SECAM band 1/2**	**AIO1**														**TU2**												
RXD	Receive Data	AIO1																										
SB1_1	**Secam band 1, tuner 1**														**TU1**						**COTV**							
SCL0	IIC bus 0 clock	AIO1			CVB										TU1	TU2	TV	IO 1			COTV		AP	AF	AF2			
SCL1	**IIC bus 1 clock**	**AIO1**																			**COTV**							
SCL2	IIC bus 2 clock	AIO1						VS																				
SCO1/2	**Scart output selection**																	**IO_1**			**COTV**							
SDA0	IIC bus 0 data	AIO1			CVB										TU1	TU2	TV	IO_1			COTV		AP	AF	AF2			
SDA1	**IIC bus 1 data**	**AIO1**																			**COTV**							
SDA2	IIC bus 2 data	AIO1						VS																				
SH1/2/C	**Standard play heads**																											
SIF1	Sound intermediate frequency, tuner 1														TU1			IO 1							AF2			
SIF2	**Sound intermediate frequency, tuner 2**															**TU2**							**AP**					
SRCLK	Shift register clock	AIO1																										KEY
SRDAT1	**Shift register data 1**	**AIO1**																										**KEY**
STROBE	Strobe pulse for shiftregister	AIO1																										KEY
SWIN	**Head switching pulse**	**AIO1**								HA																		
SYNC	Control track pulse	AIO1				DE																						
TAE	**Tape end detection**	**AIO1**																										
TAS	Tape start detection	AIO1																										
THIO	**Loading motor in/out**	**AIO1**				**DE**																						
TL	Timer LED control	AIO1																										KEY

Signal	Description	Circuit																										
TMO	**Loading motor on/off**	**AIO1**				DE																						
TRIA_ALM	Tracking information audio / Audio level indication	AIO1																						AF				
TRIV	**Tracking information video**	**AIO1**								HA																		
TU1_2_ARO	Tuner 1/2 audio right out																	IO_1						AF				
TU1A_B	**Tuner 1 audio select**														TU1						COTV							
TWB	Buzzer control	AIO1			CVB																							
TXD	**Transmit Data**	**AIO1**																										
TXT_RESET	Reset for TXT-IC (Painter)	AIO1	AIO2																									
TXTRESET	**Reset for TXT-IC (Painter)**																				COTV							
UAU	Supply for sound power amplifier										PS1									AMP								
UBAT	**Supply for high tension**										**PS1**		**LS**															
VCC	Supply for FM radio			SF																								
VDEFH	**Deflection voltage high**												**LS**															
VDEFL	Deflection voltage low												LS															
VDRN	**Vertical drive negative**												**LS**				**TV**											
VDRP	Vertical Drive positive												LS				TV											
VFC	**Video from front connector**							**VS**														**HPAV**						
VFV1	Video from frontend 1														TU1		TV	IO_1										
VFV1_2	**Video from frontend 1/2**							**VS**								**TU2**		**IO_1**						**AF**				
VFV1_2_o	Video from frontend 1/2 to TVB																							AF				
VGUARD	**Vertical protection**												**LS**				**TV**				**COTV**							
VISS	Control sync pulse inversion	AIO1				DE																						
VOL	**volume control**																			**AMP**	**COTV**							
VPDC	Video for VPS/PDC circuit				CVB			VS										IO_1			COTV			AF				
VPDC_o	**Video for VPS/PDC circuit**																							**AF**				
VREC	Video record from I/O							VS	VSEC																			
VRGB	**Supply for RGB power amplifier**												**LS**	**PT**														
VRUB	Video from signal electronics							VS									TV	IO_1						AF				
VS1/2	**View Select 1/2**																		**SF1**		**COTV**							
VSCI2	Video input scart 2																					HPAV				DOSCD		
VSCIN	**Video input scart 1**							**VS**									**TV**	**IO_1**						**AF**				
VTV	Video to TXT-IC (Painter)																TV				COTV							
W_R	**Control track write/read**	**AIO1**				DE																						
WES	Write enable for FLASH ROM	AIO1	AIO2																									
WTL	**Wind tacho left**					**DE**																						
WTLD	Wind tacho left digital	AIO1				DE																						
WTR	**Wind tacho right**					**DE**																						
WTRD	Wind tacho right digital	AIO1				DE																						

II. ADJUSTMENT PROCEDURES

A. SERVICE AND CAUTION NOTES

Caution:
Ensure that the plug is removed from the mains before carrying out any installation or removal work.

To prevent damage to the electronics, plug connectors inside the device must only be connected or unplugged when the device is at zero current.
The cables 8025, 8026, 8027 and 8028 are welded and CANNOT therefore be removed.
When inserting the TVCR unit, attach the lift flap correctly onto the "Lift flap opener".

The following points should be taken into account during maintenance work:

A. Maintenance of the VCR and TV parts

A.1 Service position for the recorder part

The service position is used for checking and replacing mechanical or electrical elements. If the unit is in this position, the mechanical parts can be checked for mobility and defective parts can be replaced. To bring the VCR unit into the service position as given in Fig. 1-1, proceed as follows:

1. Remove the rear panel after unfastening the 6 / 10 screws (55) (see Fig. D2 on page 2-18).

2. Remove the 4 screws (51)
   Remove the cinch printed board from the groove and take cable 8026 out of the cable guide (see Fig. D3 on page 2-18).
   Press down the 2 snap-on hooks (H1) and push the TVCR unit back by about 5cm.
   Unlock the mains switch with mount by pressing on the hook (H2) and take it out of the groove (not for 14" units) (see Fig. D4 on page 2-18). Remove the mains cable from the cable guide.

WARNING: To ensure that no contact is made with the mains supply (110-240V), the mains plug must always remain fitted in its mount.

3. Remove the 4 screws (51'). Detach the high tension cable (EHT) from the mount.
   Remove plug 1982/1983 to the front panel. (see Fig. D4 on page 2-18)
   Remove plug 1933.
   Take out all the cables from the cable guides (K).

4. Lift up the TV board (TVB) slightly and carefully move the unit's VCR motherboard backwards out of the unit.
   Disconnect the TV board in the groove.

5. To remove the unit's drive motherboard from the groove, unfasten the 6 screws (S1). First push back the lift by 5cm after releasing both lift locks (fig.1-13). Take out the erase head cable and the A/C head FFC cable to the motherboard from the guides in the groove (see Fig. D5 on page 2-18).
   Turn over the unit, unhook the 5 snap hooks (S) and lift the groove upwards (see Fig. D6 on page 2-18).

6. To remove the tape deck, unfasten the earthing screw (M). Disconnect all connection cables from the drive to the motherboard.
   Lift the drive backwards slightly to unfasten the plug connection to the capstan motor.
   Use pointed pliers to press together the 2 snap-on hooks (H4) and lift up the drive (see Fig. D7 on page 2-18).
   The drive can now be separated from the motherboard.
   The unit can now be operated without tape deck in "Dummy mode" (see Chapter 2 Service Test Program).

Caution:
The drive must always be kept in a horizontal position.
During assembly, the FFC cable from the A/C head to the motherboard must be laid as given in Fig. D5 (on page 2-18).
Original cable marked "O" for audio / CTL head (Fig. 1-3).

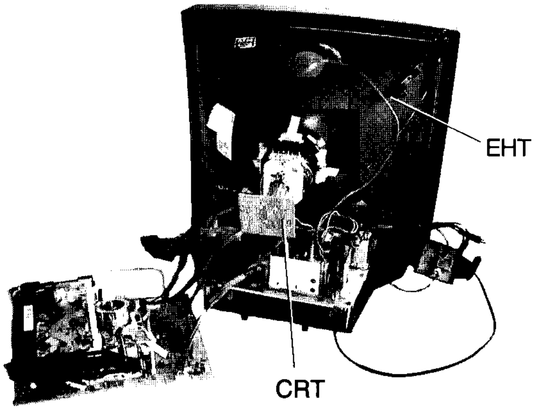


Fig. 1-1

A.2 Service Position for the TV Board (TVB)

To bring the TV board into the service position, proceed as follows:

1. Remove the rear panel after unfastening the 6 / 10 screws (55) (see Fig. D2 on page 2-18).

2. Remove the 4 screws (51)
   Remove the cinch printed board from the groove and take cable 8026 out of the cable guide (see Fig. D3 on page 2-18).
   Press down the 2 snap-on hooks (H1) and push the TVCR unit back by about 5cm.
   Unlock the mains switch with mount by pressing on the hook (H2) and take it out of the groove (not for 14" units) (see Fig. D4 on page 2-18). Remove the mains cable from the cable guide.

WARNING: To ensure that no contact is made with the mains supply (110-240V), the mains plug must always remain fitted in its mount.

3. Remove the 4 screws (51'). Detach the high tension cable (EHT) from the mount.

Remove plug 1982/1983 to the front panel.
(see Fig. D4 on page 2-2)
Remove plug 1933.
Take out all the cables from the cable guides (K).

4. Lift up the TV board (TVB) slightly and carefully move the unit's VCR motherboard backwards out of the unit. Disconnect the TV board in the groove.

5. Remove plug 1950.
Remove the 5 screws (S2) (see Fig. D8 on page 2-18).
Move the TV board (TVB) backwards slightly and lift off upwards from the plate frame.
Remove the plate frame and reconnect plug 1950 (Fig. 1-2).

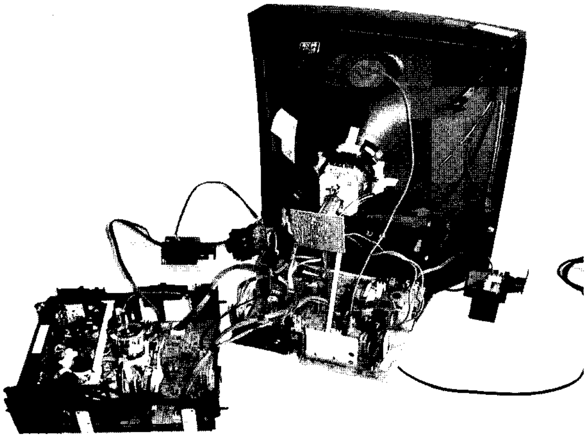


Fig. 1-2

A.3 Removing the keypad printed board

1. Remove the rear panel after unfastening the 6 / 10 screws (55) (see Fig. D2 on page 2-18).

2. Remove the 4 screws (51)
Remove the cinch printed board from the groove and take cable 8026 out of the cable guide (see Fig. D3 on page 2-18).
Press down the 2 snap-on hooks (H1) and push the TVCR unit back by about 5cm.
Unlock the mains switch with mount by pressing on the hook (H2) and take it out of the groove (not for 14" units) (see Fig. D4 on page 2-18). Remove the mains cable from the cable guide.

WARNING: To ensure that no contact is made with the mains supply (110-240V), the mains plug must always remain fitted in its mount.

Remove the TVCR unit as follows:

3. Remove plug 1982/1983 to the keypad printed board (see Fig. D4 on page 2-18), plug 1931 (14") / 1932 and 1935 (25") / 1934 (20"/21") (mains cables), 1933 and 1950.
Discharge the picture tube, disconnect the high tension cable (EHT) and the earthing cable (AQUADAG).
Carefully remove the picture tube printed board (CRT).
Unplug the speaker cable 1997 from the cinch printed board.

4. Remove the TVCR unit from the groove (see Fig. D4 on page 2-18).

5. Unfasten the 6 screws (S3) and take the keypad printed board out of the groove (see Fig. D9 on page 2-18).

Installation is carried out in the reverse order.

B. Test point information

With this model, test pin or components leads are used as contact points for adjustment and checking. In case of other test points with no test pin or components leads, use the foil solder pad to connect the measuring equipment.

C. Removal or installation of flat cables

a. Removal
Pull out the flat cable, holding it securely to avoid damaging individual wires (see fig. 1-3).

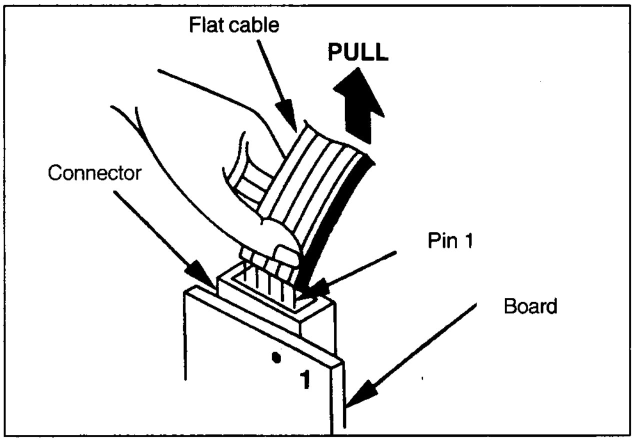


Fig. 1-3

Audio/CTL cable

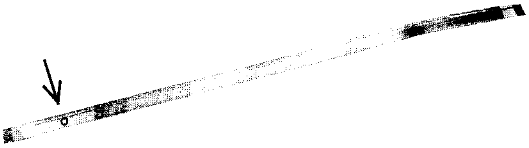


Fig. 1-3a

b. Installation
1. Adjust the position of the flat cable so that the lines on the flat cable align with the pins of the trap connector (see fig. 1-3).
2. Align individual wires with its individual trap connector hole. Then insert the flat cable wire into the trap connector.

CAUTION: After installation, inspect the connection to insure that individual wires are not bent or touching other wires.

D. Method for manual VCR loading / unloading

Turn the pulley of the loading motor.

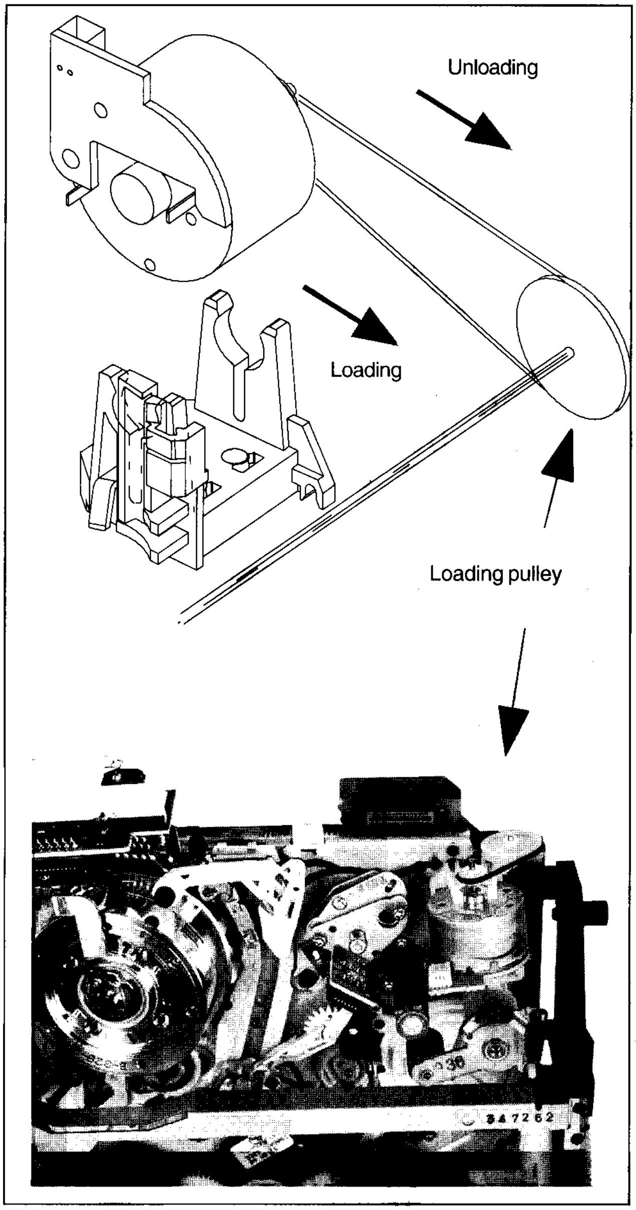
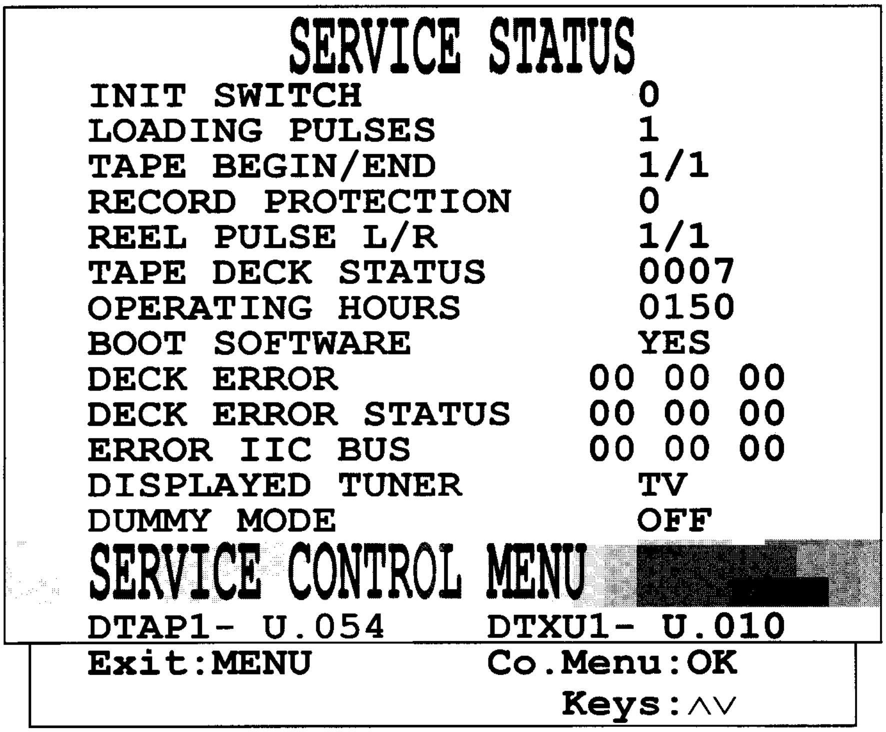

Unloading
Loading
Loading pulley

Fig. 1.4

E. Service test program

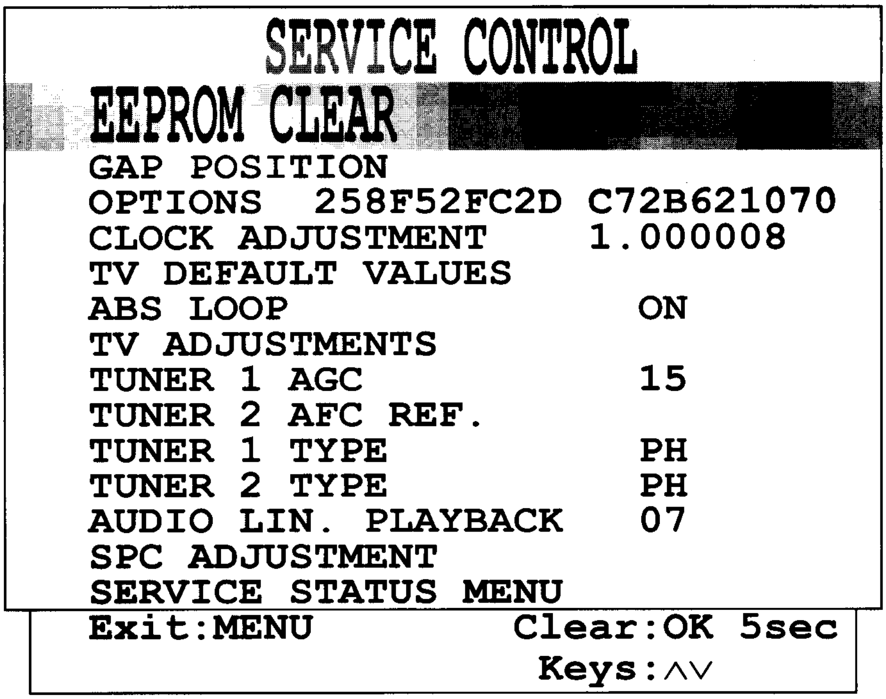
Service Status Menu



```
                SERVICE STATUS
   INIT SWITCH                  0
   LOADING PULSES               1
   TAPE BEGIN/END               1/1
   RECORD PROTECTION            0
   REEL PULSE L/R               1/1
   TAPE DECK STATUS             0007
   OPERATING HOURS              0150
   BOOT SOFTWARE                YES
   DECK ERROR                 00 00 00
   DECK ERROR STATUS          00 00 00
   ERROR IIC BUS              00 00 00
   DISPLAYED TUNER              TV
   DUMMY MODE                   OFF
   SERVICE CONTROL MENU
   DTAP1- U.054     DTXU1- U.010
   Exit:MENU        Co.Menu:OK
                       Keys:∧∨
```

Fig. 1-5

Service Control Menu



```
              SERVICE CONTROL
   EEPROM CLEAR
   GAP POSITION
   OPTIONS  258F52FC2D C72B621070
   CLOCK ADJUSTMENT     1.000008
   TV DEFAULT VALUES
   ABS LOOP                ON
   TV ADJUSTMENTS
   TUNER 1 AGC             15
   TUNER 2 AFC REF.
   TUNER 1 TYPE            PH
   TUNER 2 TYPE            PH
   AUDIO LIN. PLAYBACK     07
   SPC ADJUSTMENT
   SERVICE STATUS MENU
   Exit:MENU         Clear:OK 5sec
                         Keys:∧∨
```

Fig. 1-6

E.1 Introduction

The software for the microprocessors contains a test program for service test purposes (Service mode), which is divided into two different OSD pages:

Service status

This menu displays the drive status, the functions of various sensors and the last three errors to occur. The operating hours for the drive are also displayed, along with the mask numbers for the deck and control-µPs.

Service control

All software-controlled adjustments and resets can be performed on this level. Selecting the line 'TV ADJUSTMENTS" leads to a third level which is used for various picture settings. During this process, the setting which is currently active is displayed on the top edge of the screen, and the rest of the menu is no longer displayed.

E.2 Calling up the service test program

Press the „STOP" button on the remote control, then the „PLAY" button on the unit, and hold down both buttons for approx. 5 seconds.
The first page in Service mode is displayed (see Fig. 1-5).

Note: If the key board is not connected (service position), the Play button on the RUBAD board (pos. 1910) can be used also. Pressing the Stop button on the remote control for at least 3 secs. ejects the cassette.

By selecting the "SERVICE CONTROL" line, you can access the second page in Service mode (see Fig. 1-6).

The service test program can be called up from all operating modes on the TVCR.

All drive functions are available from Service mode.

The service menu can be switched on and off by pressing the "MENU" button, and the Service mode remains activated. The normal menu for picture and audio settings, etc. is therefore only available again after Service mode is exited.

In Service Mode the Automatic Tracking is deactivated.

To exit the service test program, press the "STANDBY" button or switch off the unit.

E.3 Service status menu

E.3.1 Function of the Init switch

```
            SERVICE STATUS
INIT SWITCH                    0
LOADING PULSES                 1
...
```

The Init switch is located on the drive. This button is used to display the status or the position of the drive, in combination with the loading pulses.

The following diagram (Fig.1 -7) displays the status of the Init switch in relation to the drive positions.

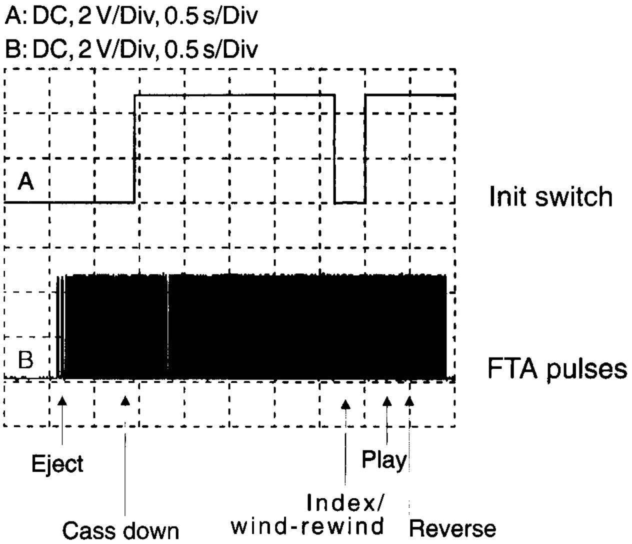


Fig. 1-7

E.3.2 Loading pulses

```
            SERVICE STATUS
INIT SWITCH                    0
LOADING PULSES                 1
TAPE BEGIN/END                 1/1
...
```

This display is used to indicate the evaluation of the „FTA" pulse (IC7900/pin4). This means that the rotations of the loading motor are recorded using a photo transistor, which results in the alternating display of „0" and „1".

E.3.3 Tape start/tape end detection

```
            SERVICE STATUS
...
LOADING PULSES                 1
TAPE BEGIN/END                 1/1
RECORD PROTECTION              0
...
```

The start or end of the tape is detected by evaluating the „TAS" (Tape Start) and „TAE" (Tape End) signals. If the tape reaches the start or end of the tape, the display switches from „0" to „1".

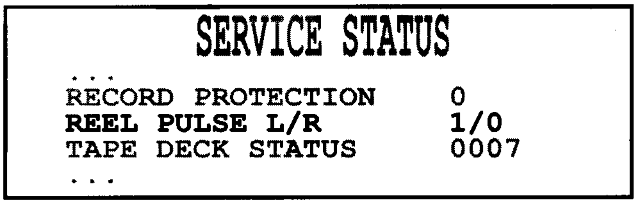
E.3.4 Record protection

```
            SERVICE STATUS
...
TAPE BEGIN/END                 1/1
RECORD PROTECTION              0
REEL PULSE L/R                 1/0
...
```

The control line „RECP" (Record Protection) gives information on whether or not the record protection on the tape is activated.

0 ... record protection OFF
1 ... record protection ON

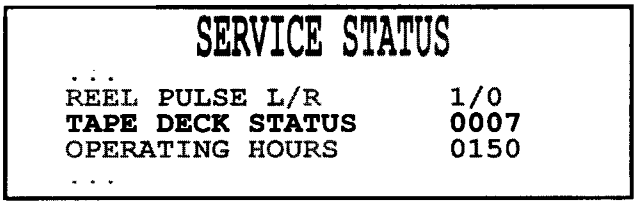
E.3.5 Head drum pulses



```
SERVICE STATUS
 . . .
 RECORD PROTECTION      0
 REEL PULSE L/R         1/0
 TAPE DECK STATUS       0007
 . . .
```

The evaluation of the tachometer winding signals „WTR“ (Wind Tacho Right) and ‘WTL’ (Wind Tacho Left) results in the alternating display of „0“ and „1“.

E.3.6 Drive status



```
SERVICE STATUS
 . . .
 REEL PULSE L/R         1/0
 TAPE DECK STATUS       0007
 OPERATING HOURS        0150
 . . .
```

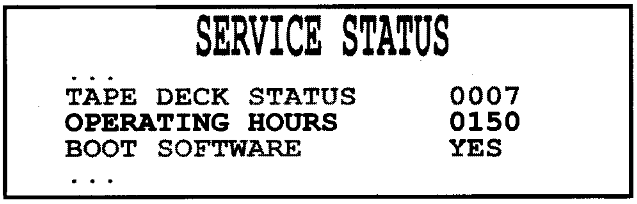
This involves a counter for the „FTA“ pulses. The counter status gives information on the current position of the drive (see Fig. 1 -7 and Fig. 1.8).

Drive positions:

Mode	Tape Deck Status
Eject	007 ±4
Index/Wind/Rewind	191 ±4
Stop	198 ±4
Play/Pause	214 ±4
Reverse	237 ±4

Fig. 1-8

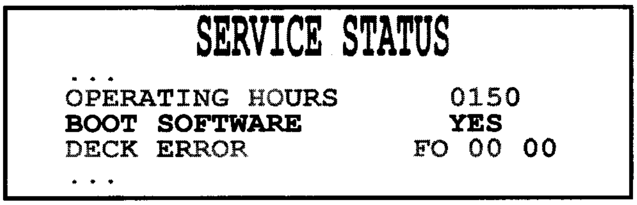
E.3.7 Operating hours counter



```
SERVICE STATUS
 . . .
 TAPE DECK STATUS       0007
 OPERATING HOURS        0150
 BOOT SOFTWARE          YES
 . . .
```

This counter displays the operating hours of the head motor.

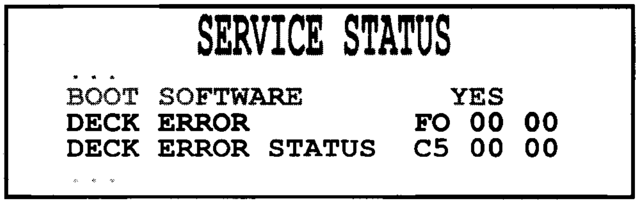
E.3.8 Boot Software



```
SERVICE STATUS
 . . .
 OPERATING HOURS        0150
 BOOT SOFTWARE          YES
 DECK ERROR           FO 00 00
 . . .
```

The "BOOT SOFTWARE" display gives information on the type of program memory used (IC7901/RUB). "YES" means that the unit is fitted with a FLASH module and therefore that a software update can be made via the service interface (1981). Where a conventional ROM/EPROM is fitted, "NO" will be displayed.

E.3.9 Drive error codes



```
SERVICE STATUS
 . . .
 BOOT SOFTWARE             YES
 DECK ERROR              FO 00 00
 DECK ERROR STATUS       C5 00 00
 . . .
```

The last 3 drive errors to occur are stored in the EEPROM. The line „DECK ERROR“ provides information on the type (Fig. 1 -9) and „DECK ERROR STATUS“ on the time (Fig. 1 -10) of the error which has occurred.

The error data can be deleted by pressing the “CLEAR” button for at least 5 sec. with the line “DECK ERROR” or “DECK ERROR STATUS”.

Error table

DECK ERROR	
00	No error
F0	Threading error
F1	Capstan error
F2	Tape broken
F3	Left reel blocked
F4	Right reel blocked
F5	Head drum blocked

Fig. 1-9

F0 Threading error

Occurs with missing threading pulses “FTA”.

F1 Capstan error

This error occurs if there are no “FGD” pulses.

F2 Tape broken

The tacho signals from the left-hand reel “WTL” and the right-hand reel “WTR” are used as a reference for this monitoring function.

F3/F4 Left/right reel blocked

Missing reel pulse ‘WTL’ or “WTR”.

F5 Head drum blocked

The “PG/FG” signal is used for this monitoring function. This is derived from the EMF from the non-current carrying coil in the head motor and provides information on the position and speed of the head drum.

Note: If one of the signals described is not available, the unit attempts to move the lift to the „EJECT“ position.

Error status table

DECK ERROR STATUS			
0C	Standby	36	Stop
1F	Play -3	37	Record
29	Still Picture	70	Index
2A	Play +2	AC	Play -5
2C	Play -9	AD	Play +5
2D	Eject	C5	Standby Eject
2E	Play +9	D4	Slow motion 1/4
2F	Play -1	D7	Slow motion 1/7
30	Pause	D8	Slow motion 1/2
32	Rewind	DF	Gap adjustment
34	Wind	EE	Record Pause
35	Play	F7	Slow motion 1/10

Fig. 1-10

E.3.10 I²C-bus error

```
SERVICE STATUS
. . .
DECK ERROR STATUS      00 00 00
ERROR IIC BUS          C2 00 00
DISPLAYED TUNER           TV
. . .
```

The communication between the µ-controller and all I²C-bus modules is checked each time the power is switched back on. If an error occurs during this process, the bus address for the relevant module is stored in the EEPROM. The 3 last error addresses to occur are stored and are saved even when the power is switched off. The error data can be deleted by pressing the „CLEAR“ button for at least 5 sec. with the line „ ERROR IIC BUS“.

Note: If an error occurs during communication with the EEPROMs or with the TXT µC, it will no longer be possible to re-start the unit. For this eventuality, a visual signal has been included which uses the LEDs.

- Record LED is flashing	>>	Error in EEPROM1 (IC7818/RUB)
- Timer LED is flashing	>>	Error in EEPROM2 (IC7801/TVB)
- Std By LED is flashing	>>	Error in TXT µC (IC7804/TVB)

The following table gives an overview of all the I²C-bus modules and their bus addresses.

ERROR IIC BUS				
Address	Position	Board	Description	
88	7800	APDOD	DPL35xx	Dolby Processing
80	7801	APDOD	MSP34xx	Stereo Decoder 1/Audio Processing
84	7670	RUB	MSP315D	Stereo Decoder 2
-- *	170x	TVB	UV1316	Tuner 1
-- *	1301	RUB	UV1316	Tuner 2
-- *	7004	RUB	LA71527M	Video /Linear Audio Processing
B8	7640	RUB	TDA9605H	FM-Audio Processing
20/21	7960	RUB	SDA5650	VPS/PDC Decoder
A2	7970	RUB	PCF8593P	Clock IC
8A/8B	7205	TVB	TDA 88xx	TV-Processing

Fig. 1-11

* .... Error detection not possible for technical reasons.

E.3.11 Display on the second tuner (only for 2 tuner sets)

```
SERVICE STATUS
. . .
ERROR IIC BUS          00 00 00
DISPLAYED TUNER           TV
DUMMY MODE                OFF
. . .
```

For repair work, it can be useful to display the picture from the second tuner, which is only used for recording. After selecting the „DISPLAYED TUNER“ line, the cursor buttons “◄” an “►” can be used to switch over between tuner 1 (TV) and tuner 2 (VCR).

E.3.12 Dummy Mode – operation without a drive

```
SERVICE STATUS
. . .
DISPLAYED TUNER           TV
DUMMY MODE                OFF
SERVICE CONTROL MENU
. . .
```

For measurements and signal tracing without a drive, the unit can be switched to Dummy Mode. This switches off all the motors and the sensors are ignored. The drive can be removed following activation (see Instructions for Removal). All drive statuses can now be selected (Play, Record,...) and the electronics (Video, Audio, IO) are switched to the relevant operating mode.
Dummy Mode can also be deactivated again with the drive installed, however the drive positions must not be changed whilst doing so, as the tape may otherwise be damaged.
Note: To prevent damage to the tape, Dummy Mode should not be switched On/Off whilst the tape is playing.
Caution: Unplug the unit from the mains before installing the drive.

E.3.13 µ-controller mask numbers

```
SERVICE STATUS
. . .
SERVICE CONTROL MENU
DTAP1- U.054      DTXU1- U.010
```

CONTROL-µC (AIO) TXT-µC (Painter)

The mask and version numbers of the control and TXT-µC are displayed in the bottom line on the control menu. The first 5 characters identify the mask name (e.g. DTAP1), and the last 3 characters stand for the version number (e.g. U.054).

E.4 Service control menu

E.4.1 Deleting the EEPROMs

```
SERVICE CONTROL
EEPROM CLEAR
GAP POSITION
. . .
```

The EEPROMs (IC7818/RUB and IC7801/TVB) store all user-specific data (timer data, program data ....) and various setting values (gap position, picture settings ....). Under certain circumstances, it may sometimes be useful to delete this memory. By pressing the „CLEAR“ button for at least 5 sec., the following data can be deleted:

- all timer data
- station data

The following values for the TV part, which are programmed at the factory, are taken from the ROM in the µ-controller:

- contrast
- brightness
- definition
- colour
- audio (volume, loudness, bass ....)

The following data are stored:

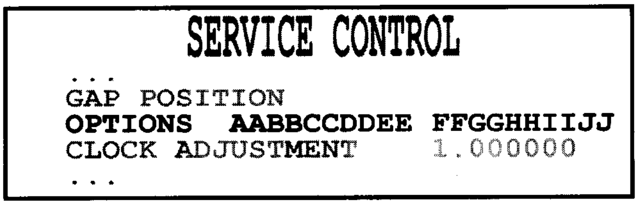
- all setting values
- option codes
- operating hours
- error codes

Caution:
After replacing the EEPROMs, only the values programmed at the factory are transferred. User-specific data and all setting values are reset to the medium values.
The unit should therefore be completely re-set (see Chapter 2 Settings) and configured.

E.4.2 Gap position

The description of this setting is given in **Chapter 2.E. Electrical settings**

E.4.3 Option codes



```
SERVICE CONTROL
...
GAP POSITION
OPTIONS   AABBCCDDEE  FFGGHHIIJJ
CLOCK ADJUSTMENT      1.000000
...
```

The characteristics of the unit are defined using the option codes. These are ten two-figure hexadecimal codes (A to J) which are printed on the nameplate on the unit (Fig. 1-12). After replacing the EEPROM (IC7818/RUB), the codes should be entered in the same order as in the service control menu.

After selecting the "OPTIONS" line, the numerical buttons on the remote control or the menu arrow keys "◀" and "▶" can be used to start the input. Hexadecimal characters can then only be selected using the "▲" and "▼" buttons. Press the "OK" button on the remote control to confirm.

Note: The input can be cancelled by pressing the "MENÜ" button (service menu is switched off and the old values are retained). Pressing "MENÜ" again switches the service menu back on.

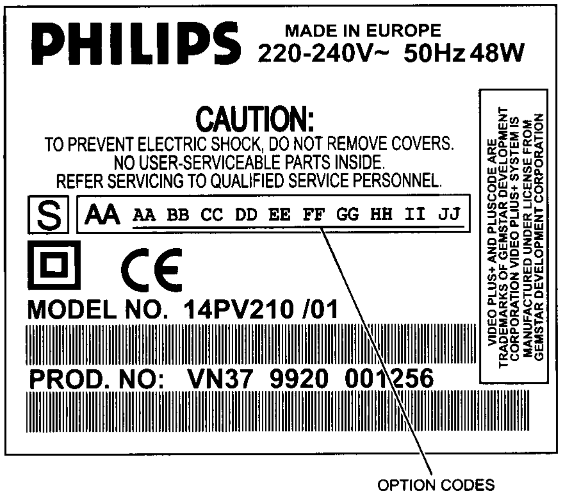
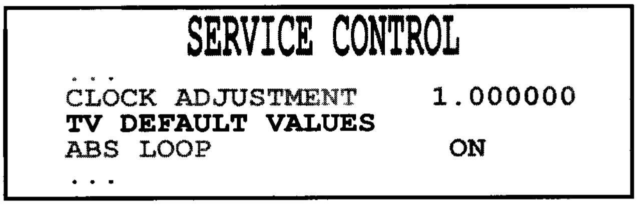

PHILIPS
MADE IN EUROPE
220-240V~ 50Hz 48W
CAUTION:
TO PREVENT ELECTRIC SHOCK, DO NOT REMOVE COVERS.
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.
S
AA AA BB CC DD EE FF GG HH II JJ
CE
MODEL NO. 14PV210 /01
PROD. NO: VN37 9920 001256
VIDEO PLUS+ AND PLUSCODE ARE TRADEMARKS OF GEMSTAR DEVELOPMENT CORPORATION VIDEO PLIUS+ SYSTEM IS MANUFACTURED UNDER LICENSE FROM GEMSTAR DEVELOPMENT CORPORATION
OPTION CODES

Fig. 1-12

E.4.4 Clock adjustment

The description of this setting is given in **Chapter 2.E. Electrical settings**

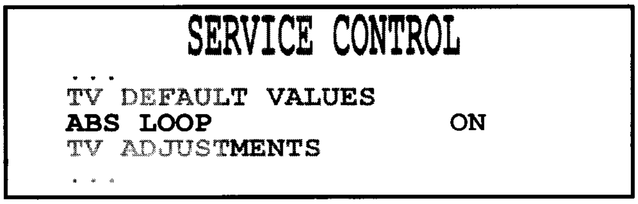
E.4.5 Basic TV settings



```
SERVICE CONTROL
...
CLOCK ADJUSTMENT     1.000000
TV DEFAULT VALUES
ABS LOOP              ON
...
```

For various adjustments in the TV section, the picture settings (contrast, brightness....) have to be set to defined values. By pressing the „OK" button for at least 5 sec. on the „TV DEFAULT VALUES" line, the values programmed at the factory are loaded.

E.4.6 Autom. black current control (ABS LOOP)



```
SERVICE CONTROL
...
TV DEFAULT VALUES
ABS LOOP                 ON
TV ADJUSTMENTS
...
```

For repair purposes, it can be useful to deactivate the ABS (Automatic Black current Stabilisation). This deactivates the control, which, depending on the „ABS" information (IC 7205 pin 18), varies the level of the RGB outputs (pins 19,20,21).

The control loop can be switched ON/OFF using the menu arrow keys "◀" and "▶".

Note: After leaving the service menu ("MENU" button or STD-BY), the ABS Loop is re-activated automatically.

E.4.7 TV adjustments

The descriptions of these settings are given in **Chapter 2.E. Electrical settings**

E.4.8 Tuner 1 AGC

The description of this setting is given in **Chapter 2.E. Electrical settings**

E.4.9 Tuner 1 Type

The description of this setting is given in **Chapter 2.E. Electrical settings**

E.4.10 Tuner 2 Type

The description of this setting is given in **Chapter 2.E. Electrical settings**

E.4.11 Tuner 2 AFC reference

The description of this setting is given in **Chapter 2.E. Electrical settings**

E.4.12 Audio linear playback

The description of this setting is given in **Chapter 2.E. Electrical settings**

E.4.13 SPC adjustment

The description of this setting is given in **Chapter 2.E. Electrical settings**

F Hotel mode

For operation in hotels, hospitals, etc., there is the option of blocking various unit functions (settings) and limiting the volume to a required maximum level.

Proceed as follows to activate hotel mode:

- Set the volume to the maximum value required
- Select program number 38 (if it cannot be selected using program Up/Down, enter it directly using the numerical buttons)
- Hold down the "STOP" button on the remote control and on the unit together for approx. 5 sec. until "H+" appears on the screen.

Deactivating hotel mode:

- Select program number 38 (if it cannot be selected using program Up/Down, enter it directly using the numerical buttons)
- Hold down the "STOP" button on the remote control and on the unit together for approx. 5 sec. until "H-" appears on the screen

G. Customer Service Mode (CSM)

G.1 General

Answering customer questions on the phone is a lot easier if the customer could be more specific about his problem. Once the Customer Information Center CIC knows the problem in the most cases the answer is easy. The Customer Service Mode helps customers to be more specific in their questions by providing them with a built in menu driven on-screen diagnostics system. It therefore helps dealers and CIC to provide fast and correct answers via phone.

The system enables:

- Easier handling of non-technical calls.
- More reliable information to the customer that a repair action is necessary.
- Identification of software versions via phone.

The Customer Service Mode is a read only, menu based information system which can be called up by the customer at home.

G.2 Calling up the Customer Service Mode

To enter the customer service mode press first STOP on the set and then MENU on the remote control and keep the keys depressed for a period of 5 seconds.
This procedure works independently of the status of Child Lock (if this feature is available) or the VCR adress.

G.3 Operation inside the CSM

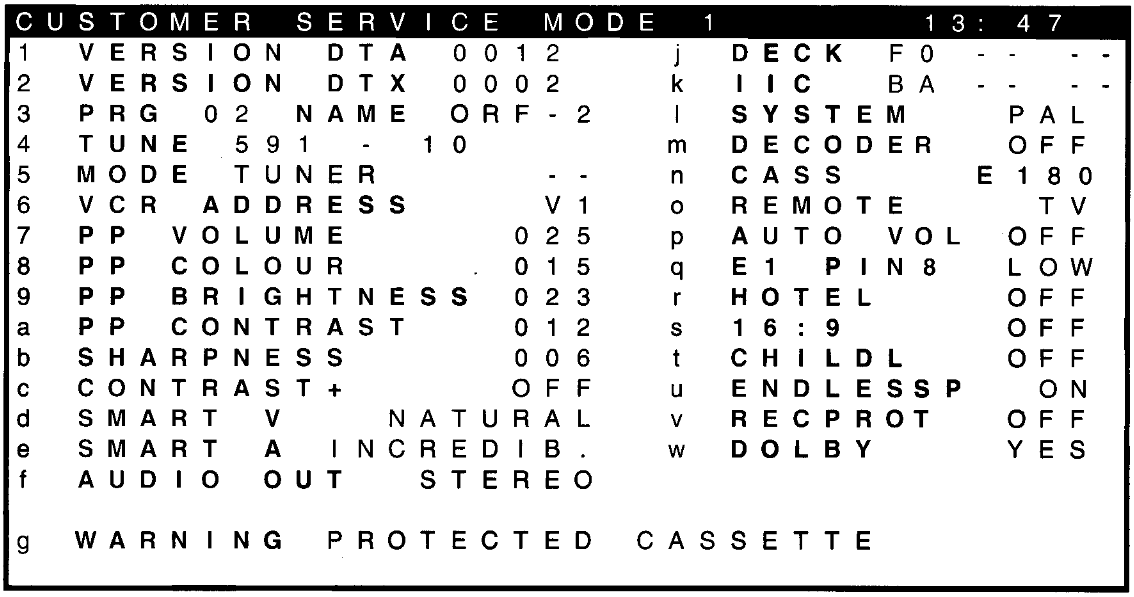
All deck functions are possible. Functions which need a menu are not allowed.
By the help of the cursor up/down the customer can step through all stored programs.
Toggling between two tables is possible by pressing the MENU button on the remote control.

G.4 Deactivation

The customer can deactivate the Customer Service Mode by pressing 'STANDBY' on the VCR.

G.5 Contents of the Customer Service Mode

Table 1



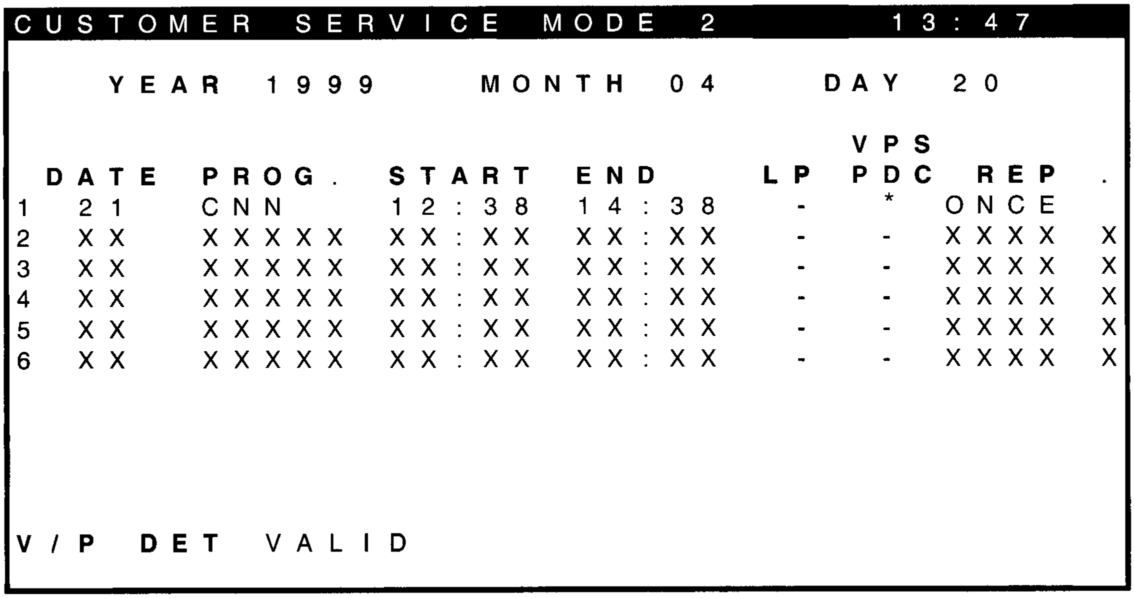
```
CUSTOMER SERVICE MODE 1                           13:47
1 VERSION DTA   0012         j  DECK    F0   --  --
2 VERSION DTX   0002         k  IIC     BA   --  --
3 PRG 02 NAME  ORF-2         l  SYSTEM          PAL
4 TUNE 591 - 10              m  DECODER         OFF
5 MODE TUNER       --        n  CASS           E180
6 VCR ADDRESS      V1        o  REMOTE           TV
7 PP VOLUME       025        p  AUTO VOL        OFF
8 PP COLOUR       015        q  E1 PIN8         LOW
9 PP BRIGHTNESS   023        r  HOTEL           OFF
a PP CONTRAST     012        s  16:9            OFF
b SHARPNESS       006        t  CHILDL          OFF
c CONTRAST+       OFF        u  ENDLESSP         ON
d SMART V     NATURAL        v  RECPROT         OFF
e SMART A     INCREDIB.      w  DOLBY           YES
f AUDIO OUT    STEREO

g WARNING PROTECTED CASSETTE
```

Indicator	Keyword	Values	Description
	XX:XX		current time, if clock not set „--:--"
1	VERSION DTA	e.g. 0001	Build number of the AIO (central controller)
2	VERSION DTX	e.g. 0001	Build number of painter (TXT, OSD,... Controller)
j	DECK		Deck Error Codes according to chapter 4.5.10
k	IIC		IIC Error Codes according to chapter 4.5.12
3	PRG	E1,E2,01...99	Program number (in playback „- -")
	NAME		Detected transmitter name (in Playback „-")
l	SYSTEM		depends on spec. of set, e.g. PAL BG, M, N SECAM / MESEC / NTSC or B/W; in REC/EE received colour system, in PB system from tape
4	TUNE		Frequency or Channel (dependent on actual selection) +optional value of fine tuning e.g. „591.25 -1" or „CH36 -1" or „CAxx", (during playback „-")

Indicator	Keyword	Values	Description
m	DECODER	ON, OFF	Decoder mode
5	MODE		Tape deck mode e.g. SCAN -11, Record Modes...,last 2 digits >> Tape Speed = LP or blank
6	VCR ADDRESS	V1, V2	VCR address (VCR1, VCR2)
7	PP VOLUME		Volume (not actual value but Personal Preference setting)
8	PP COLOUR		Colour (not actual value but Personal Preference setting)
9	PP BRIGHTNESS		Brightness (not actual value but Personal Preference setting)
a	PP CONTRAST		Contrast (not actual value but Personal Preference setting)
b	SHARPNESS		Sharpness setting
c	CONTRAST+	ON, OFF	Contrast +
d	SMART V	NATURAL, PERSONAL ,RICH,....	Smart picture setting according FRS only for sets with Smart picture, otherwise greyed out
e	SMART A	PERSONAL, INCREDIBLE, SPATIAL,...	Smart audio setting according FRSonly for sets with Smart audio, otherwise greyed out
f	AUDIO OUT		in Playback: MONO - L - R - ST - MIX;in Record or TV-mode: MONO - STEREO - I - II
g	WARNING		Last warning info according [FRS] (is stored in RAM until power down)
n	CASS	e.g. E240	Cassette length. Displays "E - - -" if no cassette in or not yet detected.
o	REMOTE	TV, V1, V2	Last detected remote address (TV, VCR1, VCR2) DETECTION INDEPENDENT OF VCR ADDRESS
p	AUTO VOL	ON, OFF	Autom. Volume Control
q	E1 PIN8	HIGH, LOW	Scart 1 Pin 8
r	HOTEL	ON, OFF	Hotel mode
s	16:09	ON, OFF	16 by 9 mode
t	CHILDL	ON, OFF	Child lock
u	ENDLESSP	ON, OFF	Endless play (Repeat)
v	RECPROT	ON, OFF	Record Protection
w	DOLBY	YES, NO	Dolby signal detected.only for sets with Dolby, otherwise greyed out

Table 2



```
CUSTOMER SERVICE MODE 2                    13:47

      YEAR 1999      MONTH 04      DAY 20

                                          VPS
  DATE   PROG.   START   END       LP     PDC   REP    .
1  21    CNN     12:38   14:38     -       *    ONCE
2  XX    XXXXX   XX:XX   XX:XX     -       -    XXXX   X
3  XX    XXXXX   XX:XX   XX:XX     -       -    XXXX   X
4  XX    XXXXX   XX:XX   XX:XX     -       -    XXXX   X
5  XX    XXXXX   XX:XX   XX:XX     -       -    XXXX   X
6  XX    XXXXX   XX:XX   XX:XX     -       -    XXXX   X



V/P DET VALID
```

Keyword	Description
XX:XX	current time, if clock not set „--:--"
YEAR	current year
MONTH	current month
DAY	current day
DATE	Timer date
PROG.	Timer programme
START	Start time
END	End time
LP	Longplay On,Off
VPS/PDC	VPS/PDC On,Off
REP.	Repetition (ONCE, WEEKL, ...)
V/P DET	Currently detected VPS/PDC signal (ERROR, VALID), in playback "-"

H. How to move the cassette holder to the down position

To move the cassette holder in the down position without a cassette tape, use the following procedure.

1. Disconnect AC plug.
2. Remove the VCR unit from the set in the sequence described in the "dismantling cabinet parts" section (chapter 2).
3. Turn the loading pulley counterclockwise (front view) until the cassette compartment is locked by the right locking tab (fig. 1-13).
4. Clear the right locking tab by moving the lever forward (fig. 1-13).
5. Turn the loading pulley counterclockwise (front view) until the cassette compartment is locked by the left locking tab (fig. 1-13).
6. Clear the left locking tab by pressing down the lever (fig. 1-13).
7. Continue to turn the loading pulley until the cassette down position is obtained.

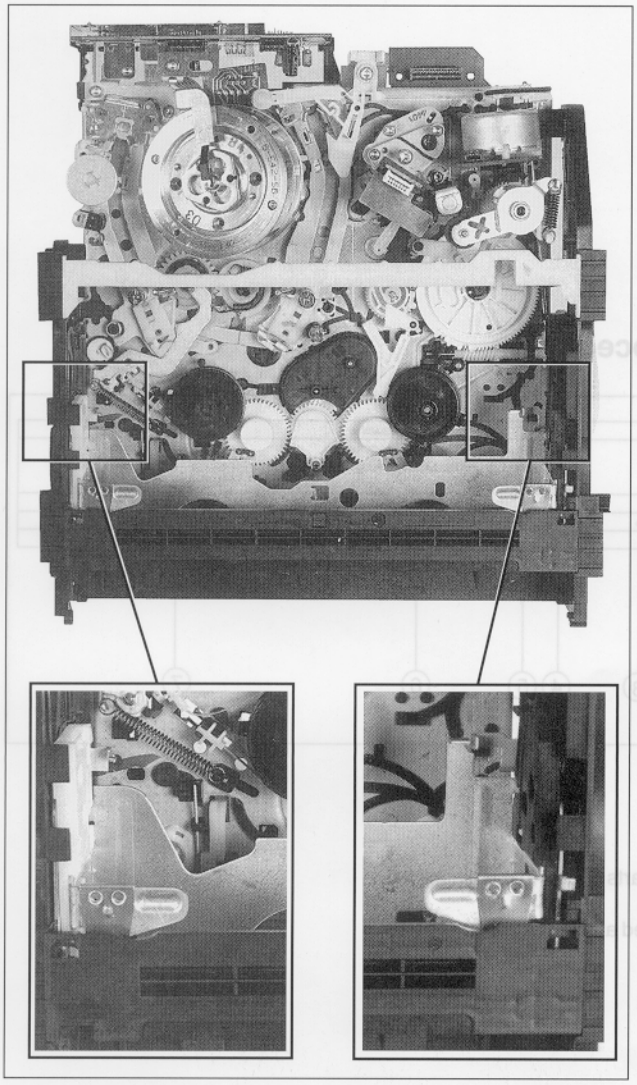


Fig. 1-13

I. How to remove the lift assembly

The lift can be removed and refitted in all deck positions with the exception of the "EJECT" position (the best position is: cassette compartment down, click stop).

To remove the cassette-up assembly:

1. Free the holding bracket (fig. 1-14) by rotating it up and back from the upper end.
2. Unscrew the 4 screws on the underside of the deck (fig. 1-15)
3. Carefully remove the cassette-up assembly vertically, noting the position of the record protect operating lever (at top).

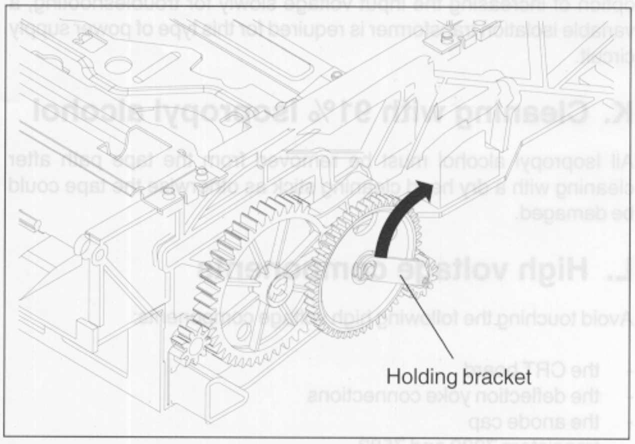


Fig. 1-14

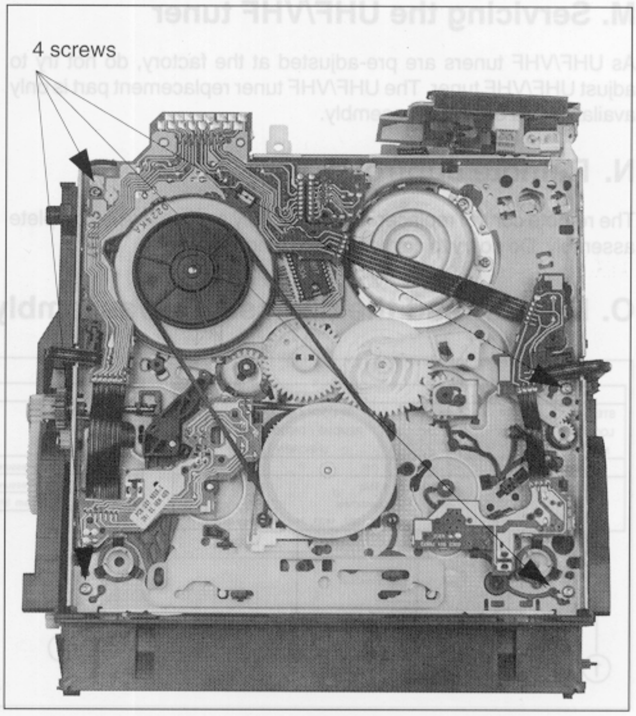


Fig. 1-15

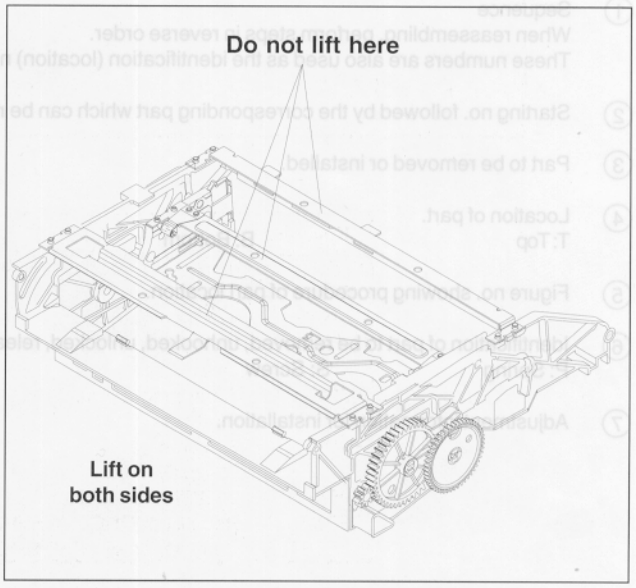


Fig. 1-16

J. Variable voltage isolation transformer

Because a hot chassis ground exists in the switched mode power supply circuit, an isolation transformer must be used. To have the option of increasing the input voltage slowly for troubleshooting, a variable isolation transformer is required for this type of power supply circuit.

K. Cleaning with 91% Isopropyl alcohol

All Isopropyl alcohol must be removed from the tape path after cleaning with a dry head cleaning stick as otherwise the tape could be damaged.

L. High voltage components

Avoid touching the following high voltage components:

- the CRT board
- the deflection yoke connections
- the anode cap
- transistors 7330 and 7583
- the terminals of the Flyback transformer.

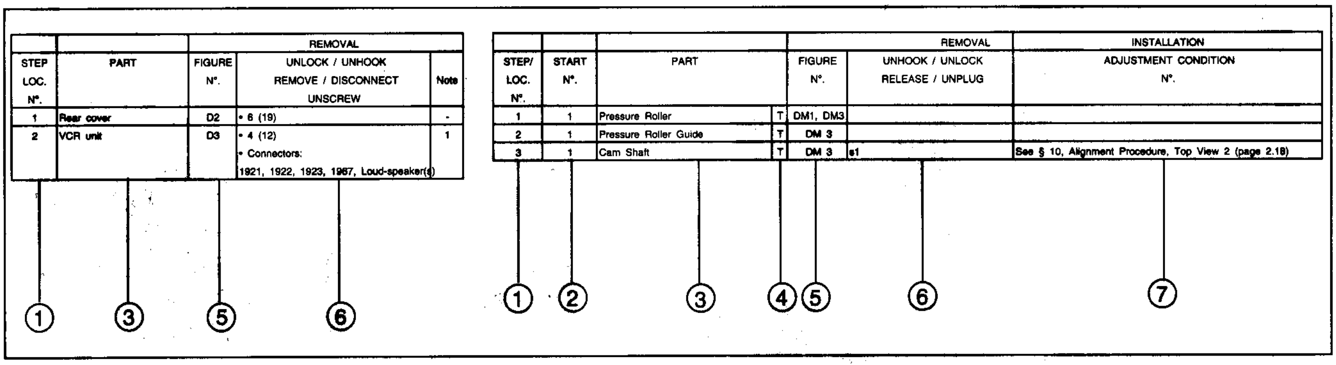
M. Servicing the UHF/VHF tuner

As UHF/VHF tuners are pre-adjusted at the factory, do not try to adjust UHF/VHF tuner. The UHF/VHF tuner replacement part is only available as a complete assembly.

N. Remote control

The remote control replacement part is only available as a complete assembly. Do no try to dismantle the remote control.

O. How to read the disassembly/assembly procedures



		REMOVAL		
STEP LOC. N°.	PART	FIGURE N°.	UNLOCK / UNHOOK REMOVE / DISCONNECT UNSCREW	Note
1	Rear cover	D2	• 6 (19)	-
2	VCR unit	D3	• 4 (12) • Connectors: 1921, 1922, 1923, 1967, Loud-speaker(s)	1

				REMOVAL		INSTALLATION
STEP/ LOC. N°.	START N°.	PART		FIGURE N°.	UNHOOK / UNLOCK RELEASE / UNPLUG	ADJUSTMENT CONDITION N°.
1	1	Pressure Roller	T	DM1, DM3		
2	1	Pressure Roller Guide	T	DM 3		
3	1	Cam Shaft	T	DM 3	s1	See § 10, Alignment Procedure, Top View 2 (page 2.18)

① Sequence
When reassembling, perform steps in reverse order.
These numbers are also used as the identification (location) no. of parts shown in the diagrams.

② Starting no. followed by the corresponding part which can be removed at this stage.

③ Part to be removed or installed.

④ Location of part.
T: Top B: Bottom

⑤ Figure no. showing procedure of part location.

⑥ Identification of part to be removed, unhooked, unlocked, released, unplugged, unsoldered etc.
P: Spring S: Screw

⑦ Adjustment information for installation.

B. MECHANICAL ADJUSTMENT PROCEDURES

1. DISMANTLING THE CABINET PARTS

1. Dismantling flow chart

This flow chart indicates the steps for dismantling the cabinet parts and the boards in order to gain access to the items for service. When reassembling, perform the steps in reverse order.

Caution:
Disconnect AC plug before dismantling.

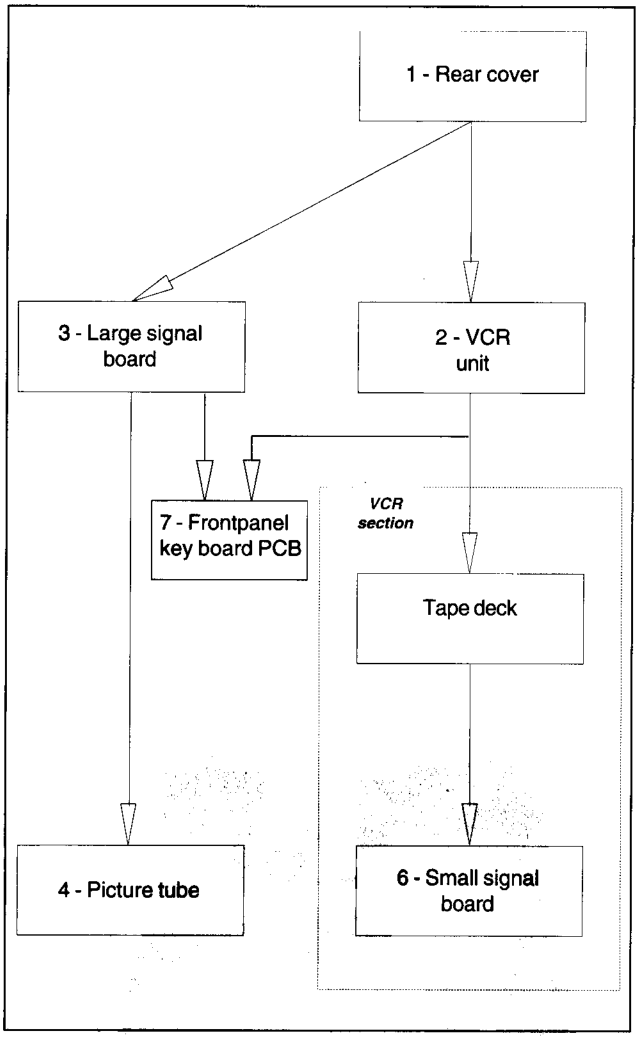


Fig. D1

2. Dismantling

		REMOVAL		
STEP LOC. Nr.	PART	FIG. Nr.	UNLOCK / UNHOOK REMOVE / DISCONNECT UNSCREW	Note
1	Rear cover	D2	6(55)	
2	VCR-unit	D4	4(51) Connectors: 1933 Cinch print	1
5	Tape deck	D5	6(S1)	
6	Small signal board	1_1	Connector:1912,1947,1948,1961,1965 Tape deck; 1(M)	5
3	Large signal board	D8	4(51) Switch board and its holder	2
4	Picture tube	D9	Anode cap and CRT board TVCR-unit Deflection yoke connector Degaussing coil connector 4(54)	2+3
7	Key board pcb	D9 D10	TVCR-unit Picture tube pcb Loudspeaker 6(S3)	

Abbreviations list:
6 (19) = 6 screws (19)

1. When reinstalling:
Ensure the tape deck unit is mounted completely on the small signal board. When inserting the TVCR unit in the set housing, the lever which serves to open the lift flap has to be pushed into the flap guide.

2. To remove the picture tube, proceed as follows:
   1) Discharge the anode to CRT Ground. Then remove the anode cap.
   2) Carefully pull-out the CRT board from the tube.
   3) Disconnect the deflection yoke connector and the degaussing coil connector from the large signal board.
   4) Place the set face down on a soft cloth before removing the picture tube.

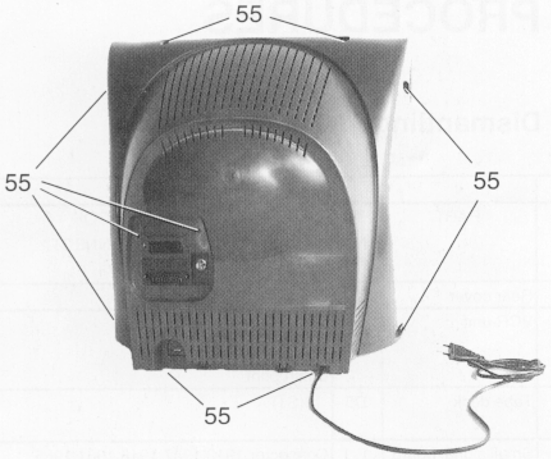

55
55
55
55
55

fig. D2

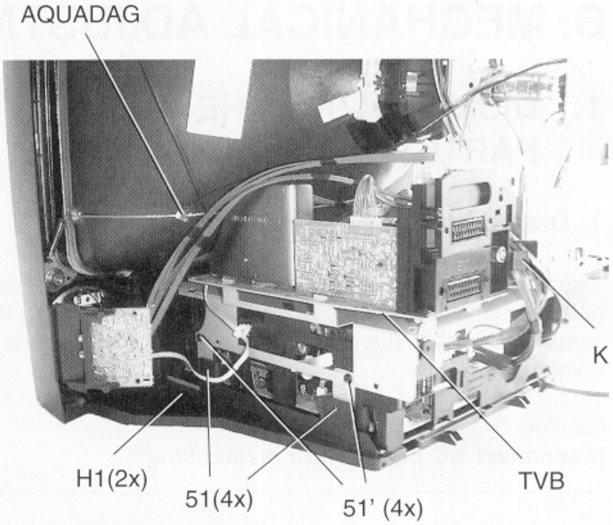

AQUADAG
K
H1(2x)
51(4x)
51' (4x)
TVB

fig. D3

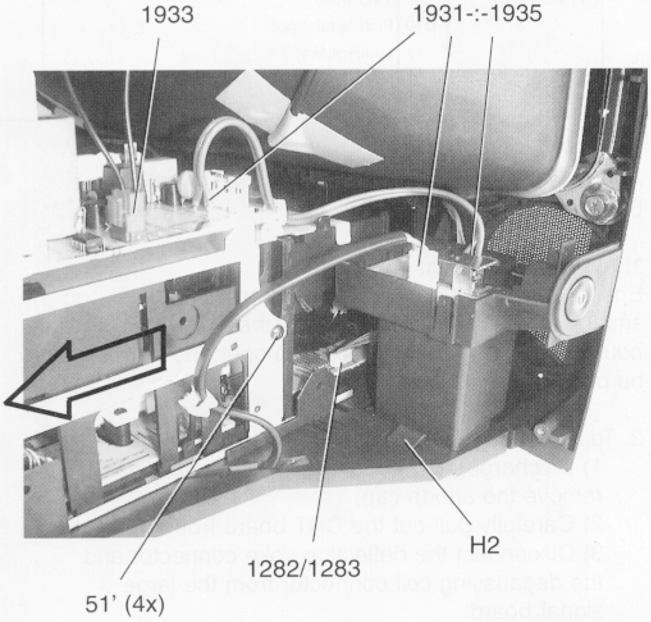

1933
1931-:-1935
H2
1282/1283
51' (4x)

fig. D4

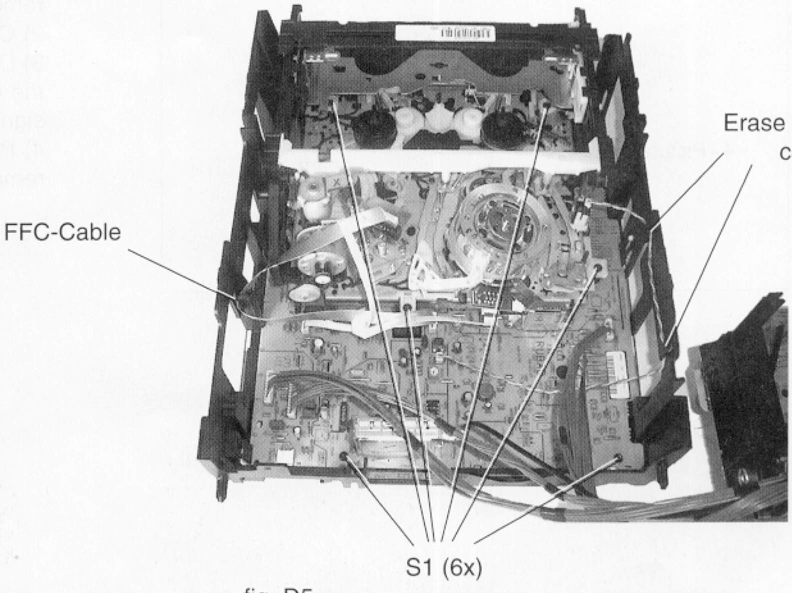

Erase head cable
FFC-Cable
S1 (6x)

fig. D5

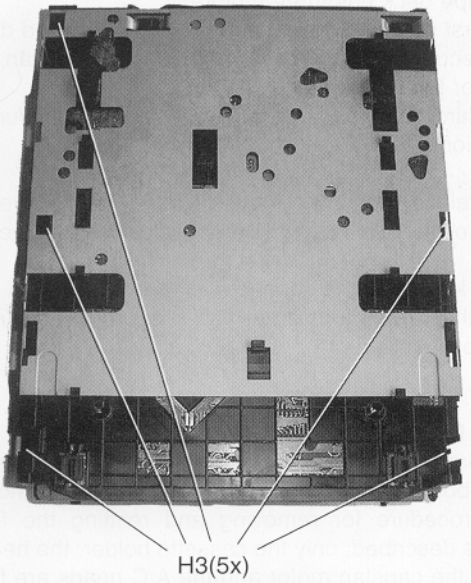


fig. D6

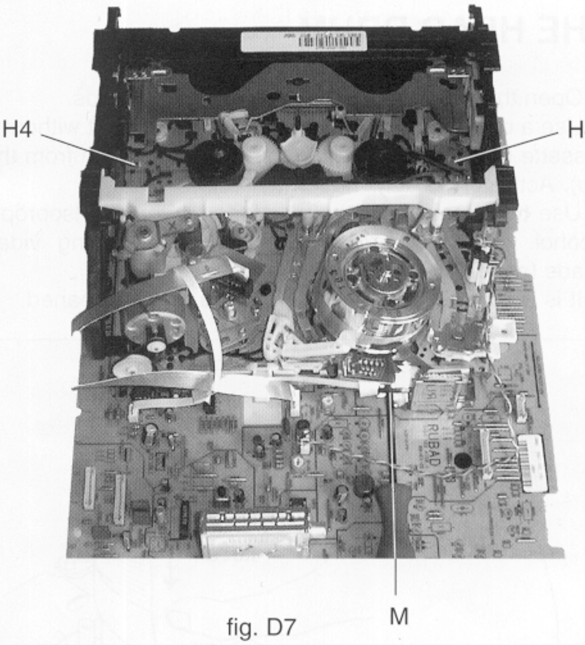


fig. D7

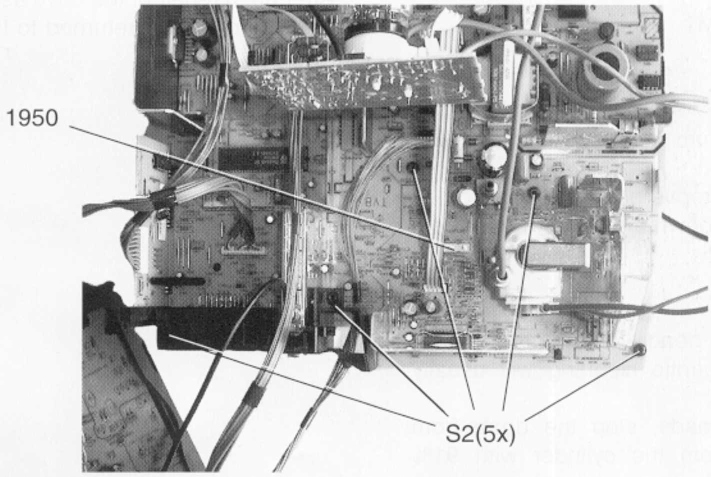


fig. D8

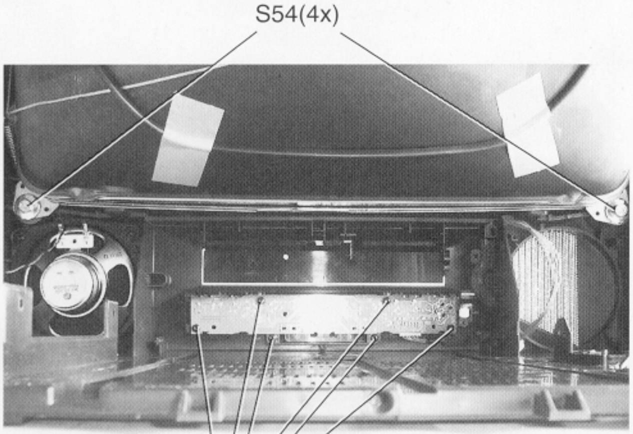


fig. D9

fig. D10

2. PROCEDURE FOR CLEANING THE HEAD DRUM

1. Open the set to gain access to the video heads.
2. Use a cassette with no tape or operate the set without a cassette (in this case, unplug the LED light prism from the top). Activate the play mode.
3. Use two cleaning cloths moistened with 91% Isopropyl alcohol. Press them gently against the rotating video heads (see fig. M1).
4. It is recommended that the full tape path is cleaned.

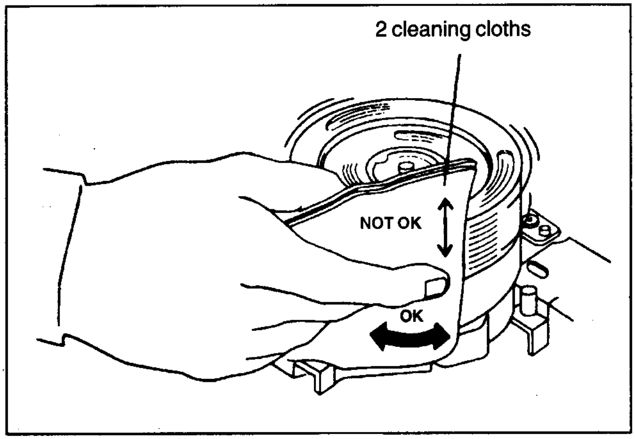


Fig. M1

CAUTION:

- Never operate or turn the drum in a clockwise direction (top view).

The oil in the one way spiral groove bearing will be forced out, causing premature breakdown of the drum motor.

NOTES:

- Do not rub vertically.
- Do not apply pressure to the head. If contaminant is not easily removed, continuous gentle cleaning will usually remove it.
- After cleaning the video heads, stop the drum from rotating, clean fingerprints from the cylinder with 91% isopropyl alcohol. Do not touch drum assembly with bare hands, use nylon gloves.

CAUTION:

All 91% isopropanol alcohol must be removed from the tape path after cleaning using a dry head cleaning cloth, as otherwise tape damage may be caused.

TAPE DECK MECHANISM

This tape deck has three motors:

- the first provides a precision drive for the head drum
- the second provides a direct drive for the capstan and belt drive for the reel tables
- the third motor drives the lift and tape loading/unloading operations.

To obtain a high repair standard we have developed a range of service kits (see mechanical replacement parts list).

These kits cover the connected spare parts.

With the exception of kit M, kits must be replaced completely.

DECK PARTS REPLACEMENT

This procedure starts with the cabinet parts, the small signal board and the cassette holder already removed.

The procedure for removing and refitting the following parts is described; only the cassette holder, the head drum motor, the capstan motor and the A/C heads are fixed by screws.

All other deck assembly parts are held by snap hooks.

IMPORTANT:

After each repair of the drive assembly, the cassette holder must be manually returned to the "EJECT" position.

3. ADJUSTMENT PROCEDURES

1. Upper cylinder replacement

Work with extreme care when removing or replacing the head disc. Do not touch video heads during servicing.

Removal:

- Remove the deck from the large signal board (refer to disassembly method on page 2-1, steps 2, 5 and 6).
- Nylon gloves should be worn when handling the upper cylinder.
- Remove 2 screws from the head amplifier bracket to gain access to the upper cylinder.
- Turn the upper cylinder until the oblong hole in the inner rotor is seen through the bigger hole of the lower portion of the cylinder motor.
- Insert reference pin C (included with each service upper cylinder) through the bigger hole of the lower cylinder motor until the pin snaps into the oblong hole on the inner rotor.

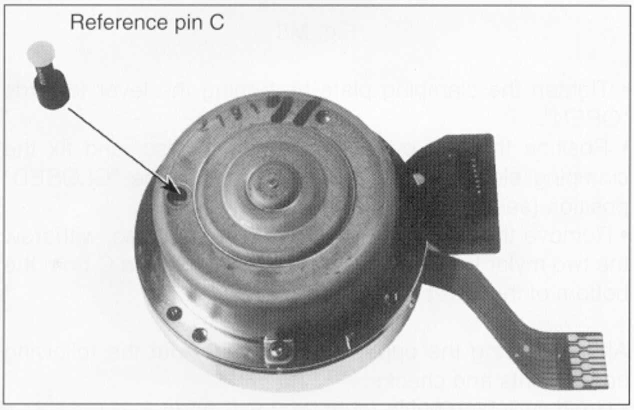


Fig. M2

- Align the upper cylinder removal tool's reference element with the ∇ symbol (Fig. M3) to remove the upper cylinder's upper clamping plate (short pins).

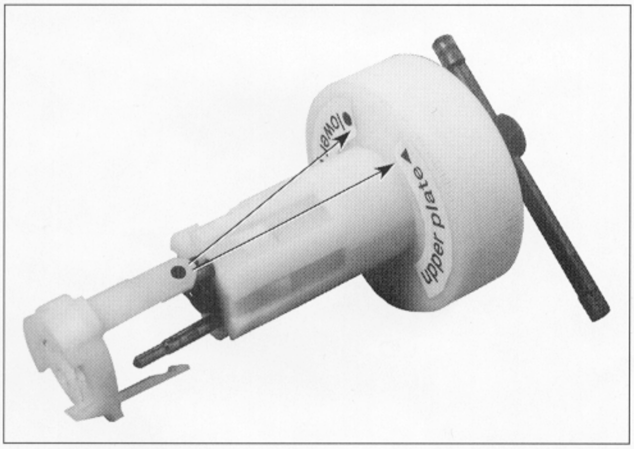


Fig. M3

- Position the upper tool's arm in the closed position, then place it on the upper clamping plate through the three holes. Turn the tool's arm 90° to the open position and remove the upper clamping plate from the upper cylinder (fig. M4).

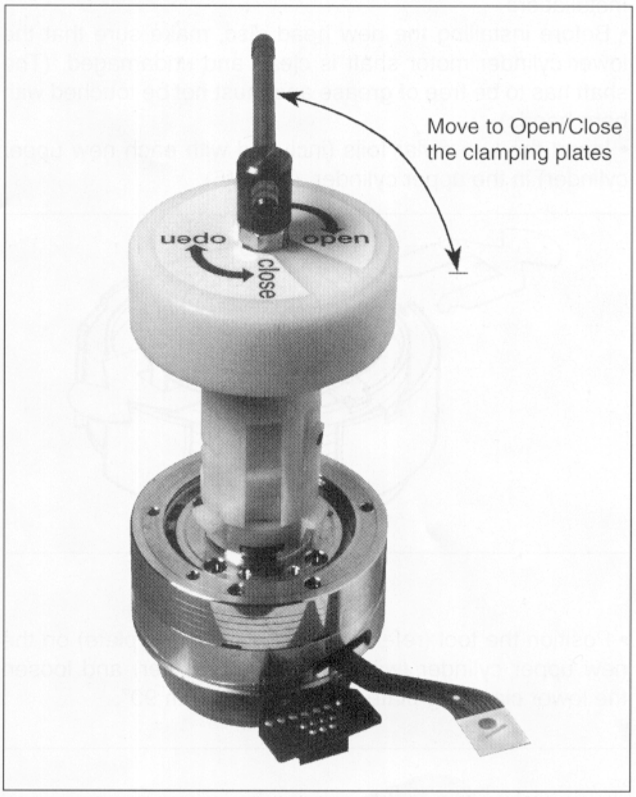


Fig. M4

- Pull the Upper Cylinder Removal Tool's reference element and align it with the O for the removal of the upper cylinder's lower clamping plate (long pins; see fig. M3).
Position the upper tool's arm in the CLOSED position, then place it on the lower clamping plate through the three holes of the upper cylinder. Ensure that all three pins snap into the lower clamping plate.
Loosen the clamping plate by turning the tool's arm 90° in the OPEN position. Remove the upper cylinder.

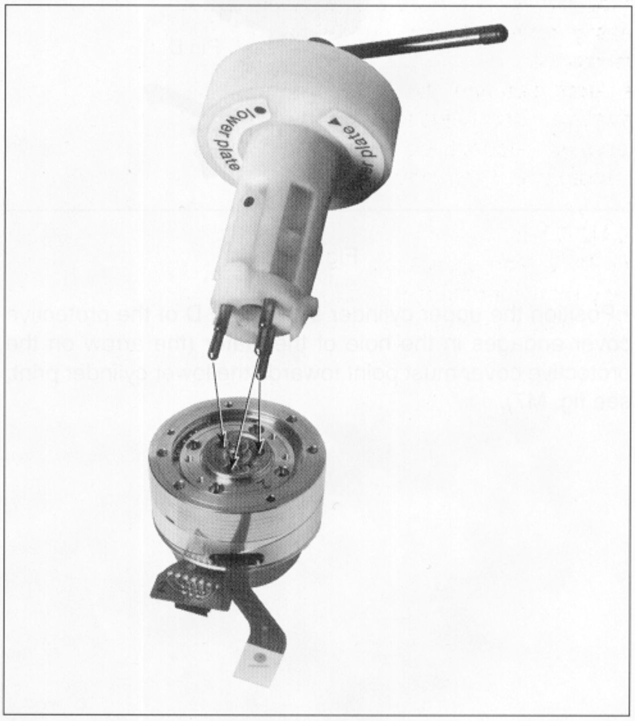


Fig. M5

Installation:

- Before installing the new head disc, make sure that the lower cylinder motor shaft is clean and undamaged. (The shaft has to be free of grease and must not be touched with bare hands).
- Insert the two mylar foils (included with each new upper cylinder) in the upper cylinder. (Fig. M6)

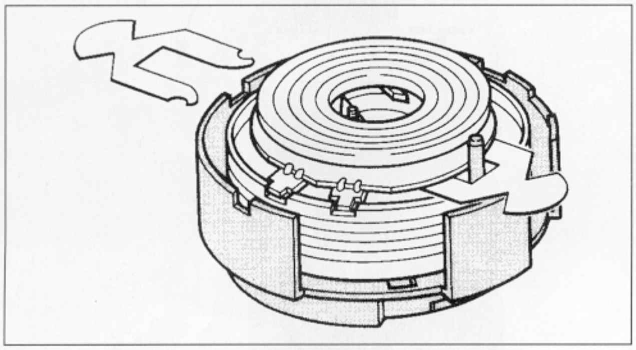


Fig. M6

- Position the tool (reference: lower clamping plate) on the new upper cylinder (with its protective cover) and loosen the lower clamping plate by turning the arm 90°.

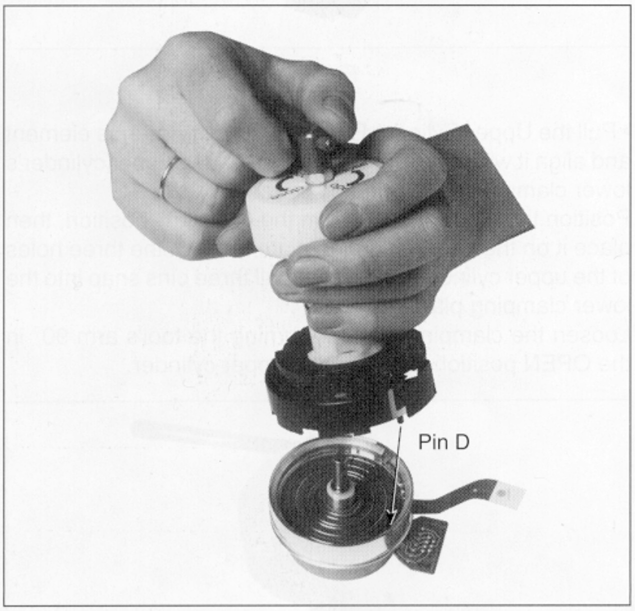


Fig. M7

- Position the upper cylinder so that pin D of the protective cover engages in the hole of the stator (the arrow on the protective cover must point towards the lower cylinder print; see fig. M7).
- Reach the exact position by pressing the tool down with a force of 1N and fix the lower clamping element by turning the arm towards "CLOSED".
- Remove the tool.
- Change the tool to "upper clamping plate" and position the clamping element exactly (see fig. M8).

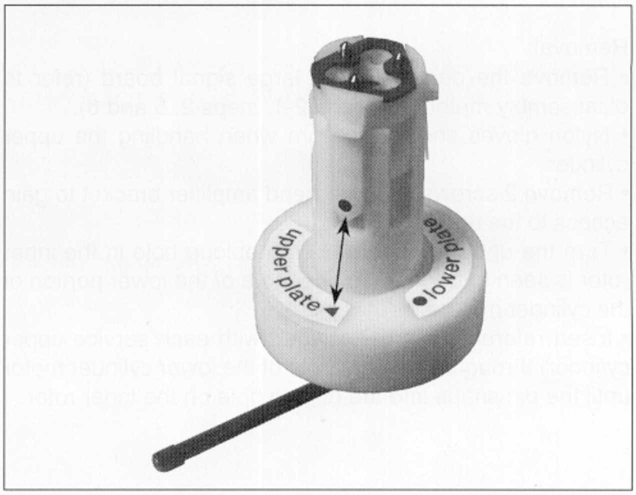


Fig. M8

- Tighten the clamping plate by turning the lever towards "OPEN".
- Position the tool evenly on the head disc, and fix the clamping element by bringing the arm to the "CLOSED" position (see fig. M4)
- Remove the protecting cap from the head disc, withdraw the two mylar foils and remove the reference pin C from the bottom of the lower cylinder.

After replacing the upper cylinder, carry out the following adjustments and checks:

- Head switching pulse (chapter 3.5.1, page 2-35).
- Record current adjustments (chapters 3.6.1, 3.6.2, page 2-36).
- Tape path alignment (chapter 4, page 2-8).

2. Replacing the scanner assy. / head drum motor

Work with extreme care when removing or replacing the scanner assy./lower cylinder motor. Do not touch Video Heads during servicing.

1. Remove the VCR unit (page 2-1).
2. Remove the tape deck assembly from the VCR unit.
3. Remove the head amplifier bracket and the upper cylinder.
4. Remove the 3 screws holding the head drum motor.

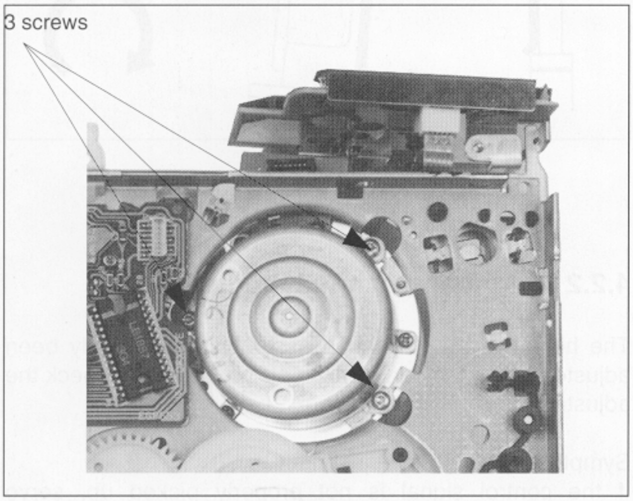


Fig. M9

5. Reinstall the new scanner assy./head drum motor onto the chassis by reversing the procedure previously described.

Note:
If any of the parts of the tape path are touched, clean them with a cleaning cloth saturated with 91% isopropyl alcohol.

3. Position adjustment of the tension arm

3.1 Brake band adjustment

- Set the drive to PLAY mode.
- Adjust the brake band my means of adjusting tool (from the underside of the deck) until the edge of the elbow of the tape tension arm overlaps with the left inner edge of the left guide (see fig. M10/M11).

3.2 Tape tension adjustment

- Play a cassette tape (E180) from the beginning of the tape.
- Measure the tape tension before the left roller unit with a Tentelometer.
- Adjust (from the underside of the drive) the tension arm spring, pos. 11, to a tape tension of 0.24N ± 0.02N e.g. 24g ± 2g with the adjustment tool (see fig. M10/11).

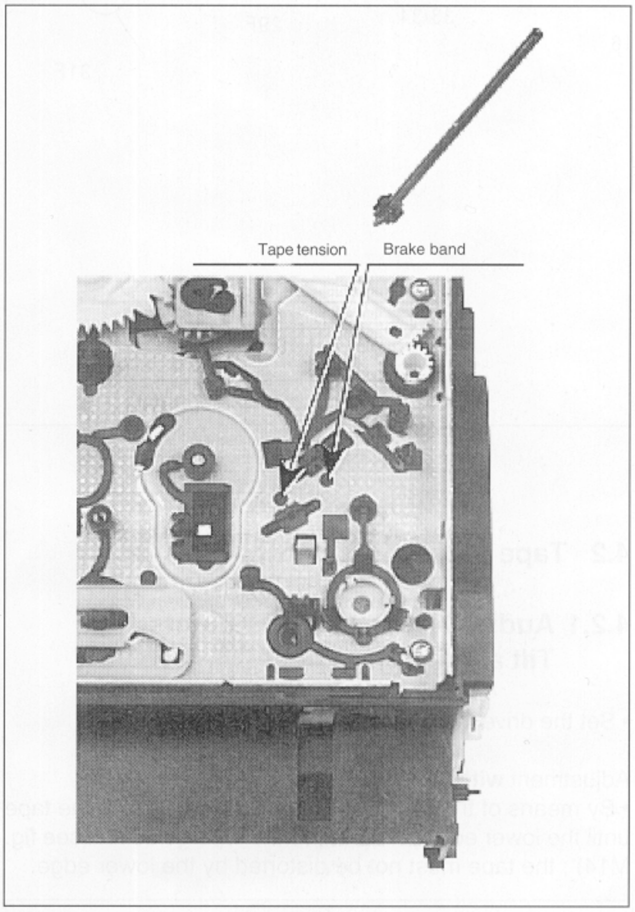


Fig. M10

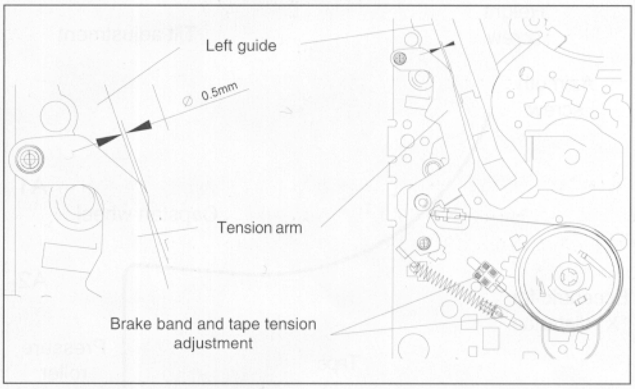


Fig. M11

4. Tape path adjustment (final adjustment)

4.1 View of the tape path

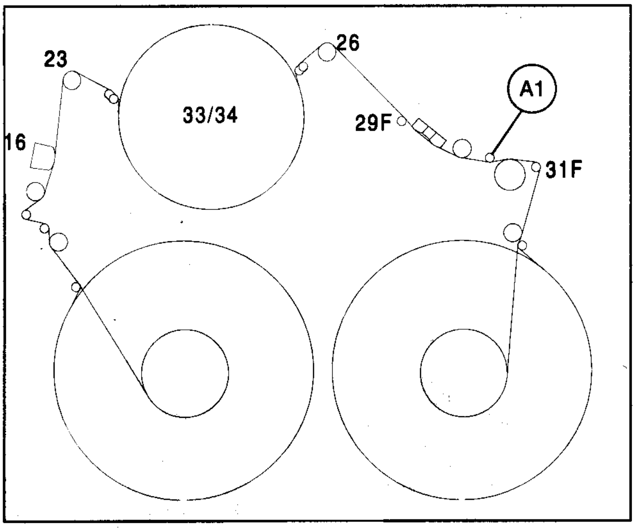

23
26
33/34
A1
29F
16
31F

Fig. M12

4.2 Tape path adjustment

4.2.1 Audio/CTL head adjustments Tilt angle adjustment

- Set the drive to the "SEARCH FORWARD" mode.

Adjustment **with** tape guide A1:

- By means of the tilt angle adjusting screw, move the tape until the lower edge just touches the tape guide A1 (see fig. M14) ; the tape must not be distorted by the lower edge.

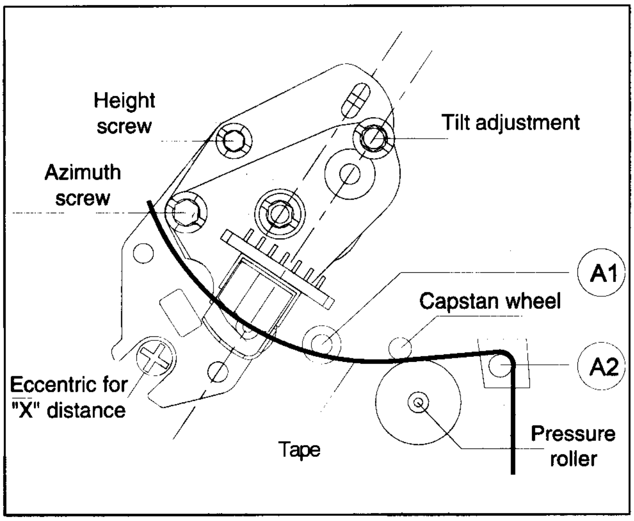

Height screw
Tilt adjustment
Azimuth screw
A1
Capstan wheel
A2
Eccentric for "X" distance
Pressure roller
Tape

Fig. M13

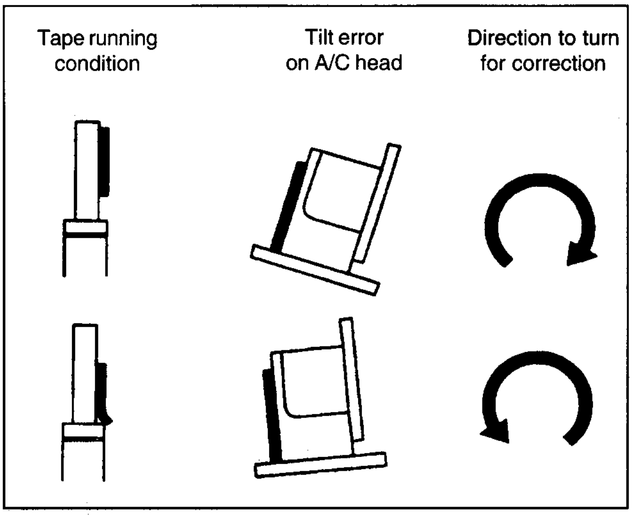

Tape running condition
Tilt error on A/C head
Direction to turn for correction

Fig. M14

4.2.2 Height and azimuth adjustments

The height of the A/C head assembly has already been adjusted at the factory, so it is only necessary to check the adjustments.

Symptom of incorrect adjustment.
If the control signal is not properly picked up, servo operation cannot be achieved.

This control is required if the A/C head has been replaced, or if it is completely incorrectly adjusted.

1. Basic height adjustment

Looking at the lower edge of the control head, with a E180 cassette tape in motion, ensure that the lower edge of the tape runs 0.25 mm above the lower edge of the control head.

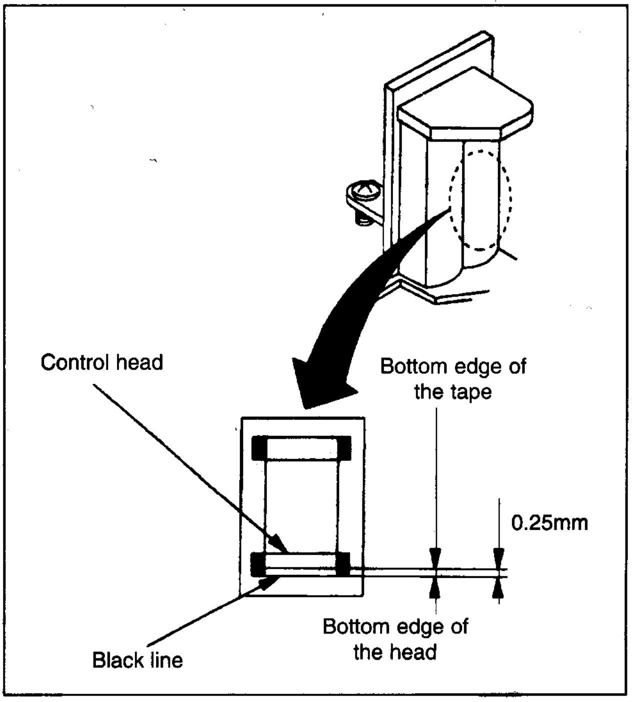

Control head
Bottom edge of the tape
0.25mm
Bottom edge of the head
Black line

Fig. M15

2. Final height and azimuth adjustment

Symptom of incorrect adjustment:
If the position of the A/C head is not properly adjusted, the audio S/N ratio is poor.

- Connect an oscilloscope to the linear audio output.
- Play the 1 kHz audio section on the test cassette.
- Adjust for maximum output voltage by means of the height adjustment screw (see fig. M15).
- Play the 6 kHz audio section on the test cassette.
- Adjust to maximum output voltage by means of the azimuth adjustment screw. (fig. M15)
- If necessary, repeat this procedure
- Check the tilt angle adjustment (see chapter 4.2.1).

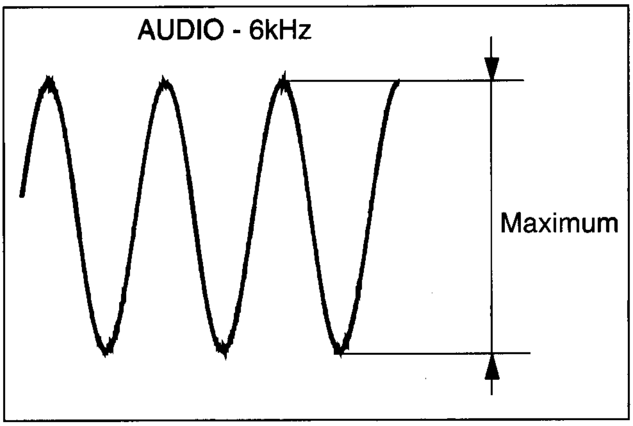


Fig. M16

If the tape path was completely out of adjustment or if several components in the tape path have been replaced, the above mentioned adjustments might have to be repeated several times.

4.2.3 “x” distance adjustment

- Before starting this adjustment, set the VCR in the “EJECT” position.
- Activate the Service Mode according to the description on page 1-11 (automatic Tracking is not active in Service Mode).
- Insert the test cassette and enter the PLAY mode.
- Playback the Black & White part of the test cassette.
- Display the TRIV signal on an oscilloscope (DC-coupled) and adjust for maximum voltage by means of the eccentric screw (fig M13).

5. Control with the TRIV signal of the tape path adjustment

Symptom of incorrect adjustment:
If the envelope output is poor, the picture will contain a lot of noise. In this case the tracking will lose precision and the playback picture will be distorted by any slight variation of the tracking control circuit.

5.1 Left and right roller unit

Preparation:
- Connect one input of a dual trace oscilloscope to observe the tape sync pulse and the other input (DC coupled) to observe the tracking information TRIV.
- Trigger the oscilloscope externally on the head pulse HP1.
- Playback the black and white section of the alignment tape.

1. Enter the manual tracking mode (Menu “TAPE” > “TRACKING”) and change the tracking value with the ▶ or ◀ keys on the remote control.
2. Watch the tape sync pulse move to the left in relation to the TRIV signal.
3. Note the extreme left hand position reached by the sync pulse. Repeat as necessary.
4. Stop the movement of the pulse when the TRIV signal reduces from 1/2 to 2/3 of its maximum amplitude. A noisy picture (disturbance) is visible on the TV set and the CTL pulse should be to the left of the display.

This position will be stored unless the tape is ejected or the tracking is manually modified.
This condition works only if X-distance is correctly adjusted (see chapter 4.2.3).

Adjustment:
Adjust the left and right roller units to obtain the tracking signal TRIV as straight and flat as possible. (Fig. M17)

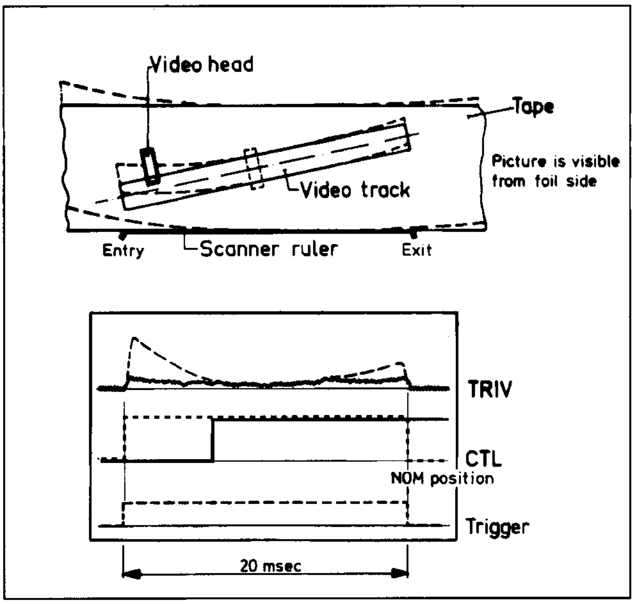
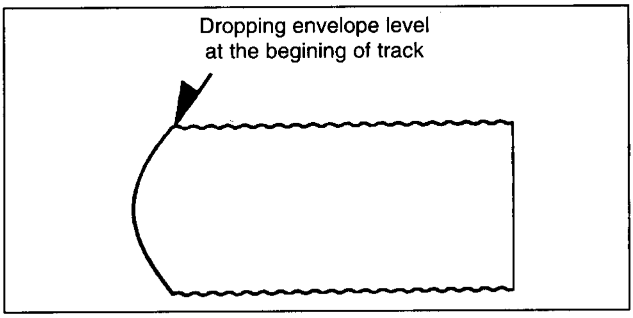
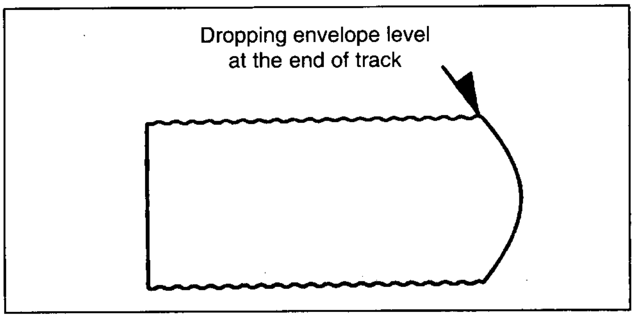


Fig. M17

When looking at the envelope output, the following possibilities are given (test point: pin 9 connector 1902):

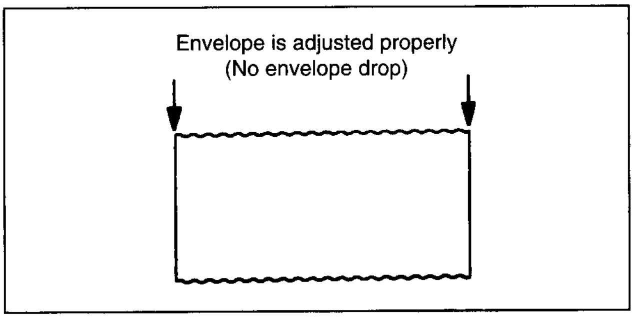

Dropping envelope level
at the begining of track

Dropping envelope level at the beginning of track (test point: pin 9 connector 1902).


Dropping envelope level
at the end of track

Dropping envelope level at the end of track (test point: pin 9 connector 1902).

When left and right roller units are adjusted properly, there is no envelope drop at the beginning or end of the tracks as shown in the above illustration.


Envelope is adjusted properly
(No envelope drop)

The tape path is properly adjusted.

6. Friction clutch control in playback

- Set the drive to "PLAY" mode.
- Place the torque meter on the right reel.
- Turn the capstan motor to move the right reel clockwise.
- Keep turning until the indication at the torque meter no longer changes (see fig. M18)
- The torque has to be 10.5 mNm ± 25% (105 gFcm ± 25%).

7. Reverse brake control

- Set the drive in the "SEARCH REVERSE" position.
- Place a torque meter on the right reel and turn the reel anti-clockwise, until the reel just starts to flip.
- The value indicated at the torque meter must be 7 mNm ± 3 mNm (70 gFcm ± 30 gFcm).

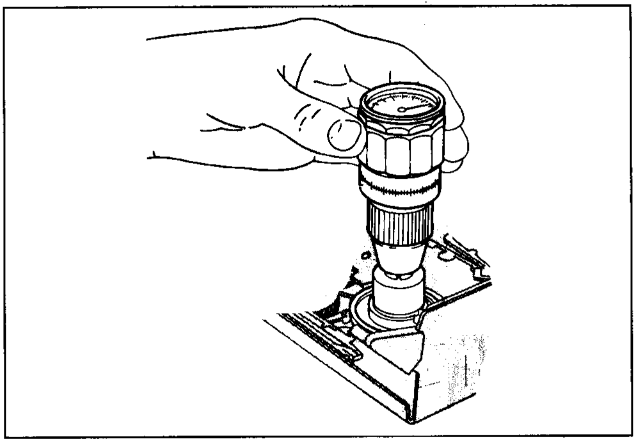


Fig. M18

8. Capstan motor replacement

- Set the drive assembly to the "EJECT" position.
- Remove the capstan belt on the underside.
- Remove the three capstan motor fixing screws (see fig. M19) and withdraw the capstan motor downward from the drive assembly.

Reassemble in reverse order. Make sure that the capstan shaft is free of grease.

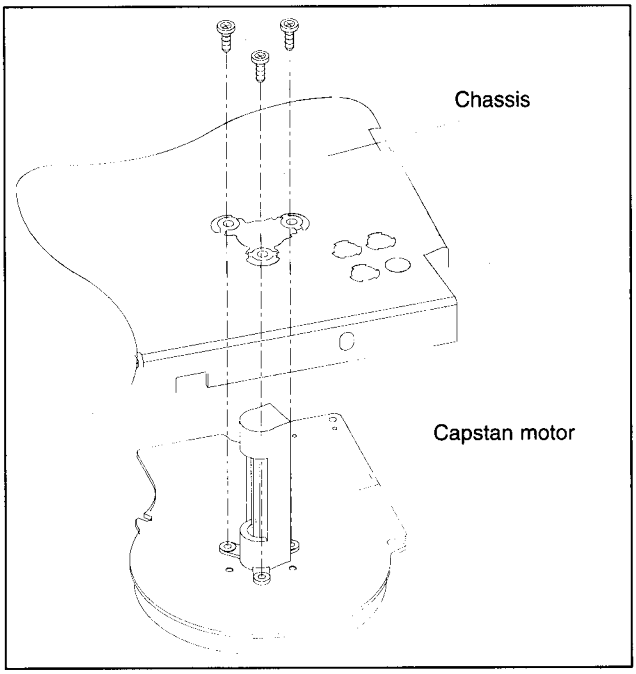

Chassis
Capstan motor

Fig. M19

9. Disassembly/Assembly procedures of mechanism

This procedure starts with the back cover, the small signal board, the shielding plate and cassette-up assembly already removed.
Also, all the following procedures for adjustment and parts replacement should be performed while unit is in the cassette -own position (page 2-12). When reassembling, follow the steps in reverse order.
It is not necessary to remove the cassette-up assembly for all these replacements, only the drawings and photos are done without cassette-up assembly lift and sensor print

				REMOVAL		INSTALLATION
STEP/ LOC. N°.	START N°.	PART		FIGURE N°.	UNHOOK / UNLOCK RELEASE / UNPLUG	ADJUSTMENT CONDITION N°.
1	1	Pressure Roller	T	DM1, DM3		
2	1	Pressure Roller Guide	T	DM 3		
3	1	Cam Shaft	T	DM 3	s1	See § 10, Alignment Procedure, Top View 2 (page 2.18)
4	4	Loading Motor	T	DM 1, DM 4		
5	4	Pulley Shaft Assembly	T	DM 1, DM 5	Loading Motor Holder/ Capstan Motor	See § 8, Replacement of Capstan Motor (page 2.10)
6	6	Reverse Lever	T	DM 1		See § 10, Alignment Procedure, Top View 2 (page 2.18)
7	6	Intermediate Lever	T	DM 1	s2	See § 10, Alignment Procedure, Top View 2 (page 2.18)
8	6	Cam Wheel	T	DM 1	s3	See § 10, Alignment Procedure, Top View 2 (page 2.18)
9	9	A/C Head	T	DM 1, DM 6	* connector, screw, clip (A)	See § 4.2.1 et § 4.2.2 (page 2.8)
10	10	Cleaning Roller	T	DM 1	s4	Small plastic spring of cleaning roller arm must be placed on the left side of the pin from the chassis.
11	11	Roller Unit Right	T	DM 1, DM 7		See § 5.1 (page 2.9)
12	11	Loading Arm Right	T	DM 1, DM 8		See § 5.1 (page 2.9)
13	13	Loading Arm Left	T	DM 1, DM 9	Part of Sensor Print	See § 5.1 (page 2.9)
14	11	Roller Unit Left	T	DM 1, DM 10		See § 10, Alignment Procedure, Top View 2 (page 2.18)
15	11	Loading Gear	T	DM 2		See § 10, Alignment Procedure, Top and Bottom Views (page 2.18)
16	16	Erase Head Assembly	T	DM 1, DM 11		
17	17	Tension Arm	T	DM 1, DM 12	Brake Band Tension Arm Spring	See § 3.2, Tape Tension Adjustment (page 2.7)
18	18	Brake Band	T	DM 12		See § 3.1, Brake Band Adjustment (page 2.7)
19	18/19	Reel Table (S/T)	T	DM 1, DM 12		
20	20	Main Brake (Left / Right)	T	DM 1, DM 12	Brake Spring	
21	18/19	Brake Gear (Left / Right)	T	DM 1, DM 12 DM 13		
22	22	Tension Crank	T	DM 1, DM 16		See § 10, Alignment, Top View 2 (page 2.18)
23	23	Reverse Brake	T	DM 1, DM 17		Place in cam of Slider Gear See § 10, Alignment, Bottom View (page 2.18)
24	6-7,23	Slider Gear	T	DM 1, DM 17		See § 10, Alignment, Bottom View (page 2.18)
25	25	Worm Shaft	T	DM 1	s5, s6	Set Mechanism in "EJECT" Position
26	26	Swivelling plate / Swivelling Gear	T	DM 1	s7	
27	27	Record Protection Lever	T	DM 1	* Spring s8, s9	
28	28	Gear Pulley	B	DM 14	Capstan Belt	
29	29	Clutch Assembly	B	DM 2, DM 16	Gear Pulley	
30	30	Clutch Lever	B	DM 2	Spring, Gear Pulley, s10, s11	
31	30	Changing Gear	B	DM 2		
32	30	Double Gear	B	DM 2, DM 13	Clutch Lever, Changing Gear	
33	30	Main Slider	B	DM 2, DM 16		
34	30	Cam Wheel Lever	B	DM 2, DM 16	Part of Sensor Print	
35	35	Cassette Loader Trigger	B	DM 2, DM 16	Part of Sensor Print	
36	36	Cassette Loader Gears	B	DM 1, DM 2 DM 16	* clip	
37	37	Tension Lever	B	DM 2, DM 16	Part of Sensor Print	
38	37	Cam Wheel Tension	B	DM 2, DM 16		See § 10, Alignment, Bottom View (page 2.18)
39	37	Cam Wheel Reverse	B	DM 2, DM 17		

List of abbreviations: T: Top, B: Bottom, C: clip,
S: Snap hook.

Top view

Shown in the EJECT position

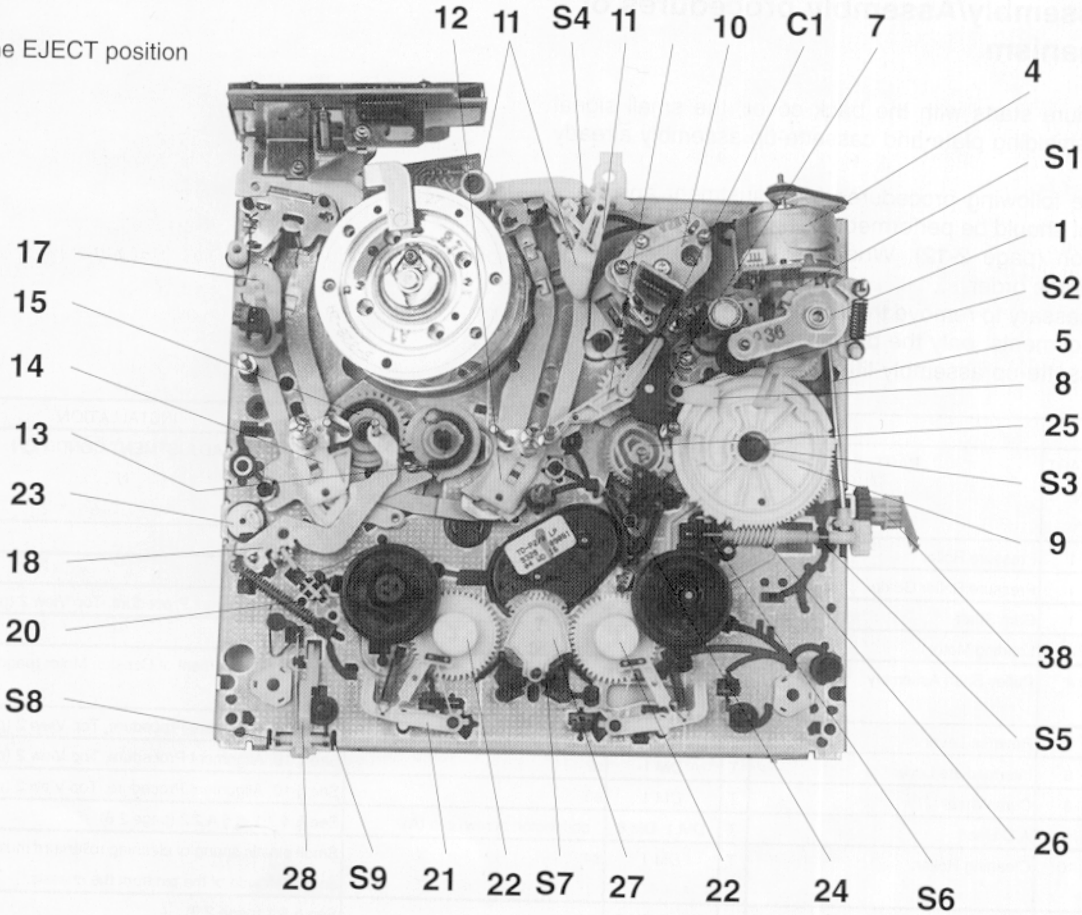

12
11
S4
11
10
C1
7
4
S1
1
S2
5
8
25
S3
9
38
S5
26
17
15
14
13
23
18
20
S8
28
S9
21
22
S7
27
22
24
S6

Fig. DM 1

Bottom view

Gear pulley already removed

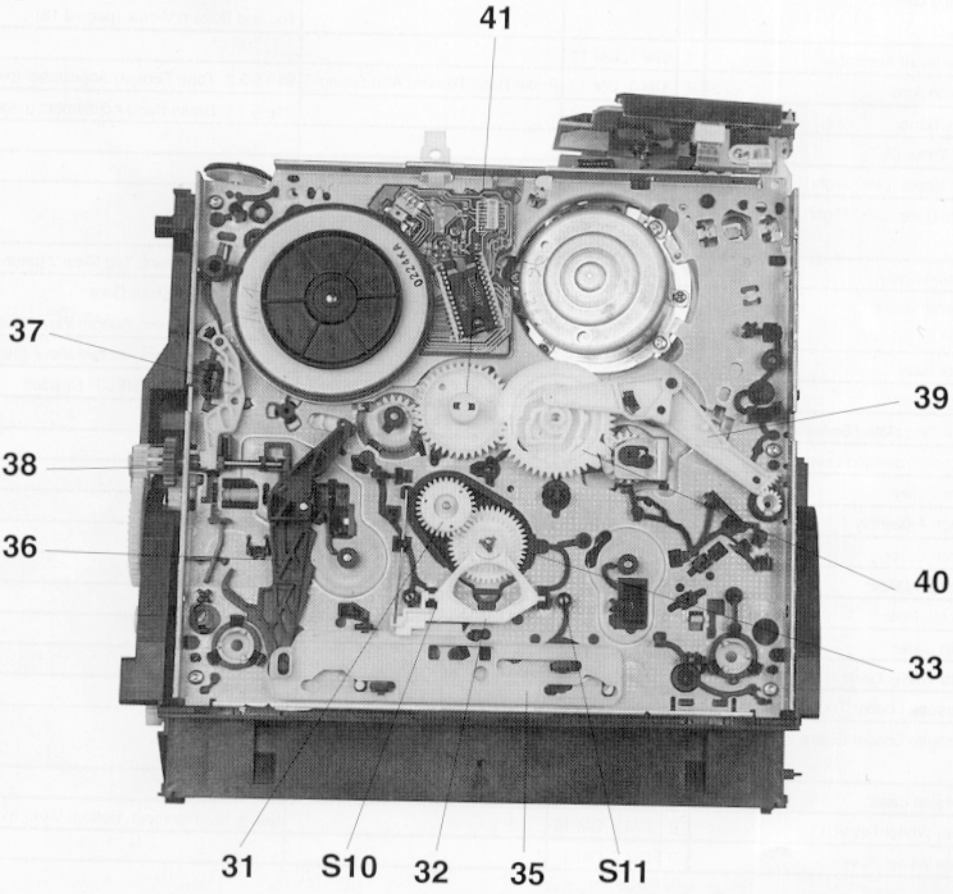

41
37
38
36
39
40
33
31
S10
32
35
S11

Fig. DM 2

Pressure roller

- Set the drive assembly to "EJECT" position.
- Unhook and remove the pressure roller tension spring (a).
- Release the pressure roller guide from the guide in the loading motor holder by pressing the top of the motor guide rearwards (b) and rotating the pressure roller guide assembly clockwise by approximately a quarter of turn (c).

The pressure roller and guide can now be lifted clear (see fig. DM 3).

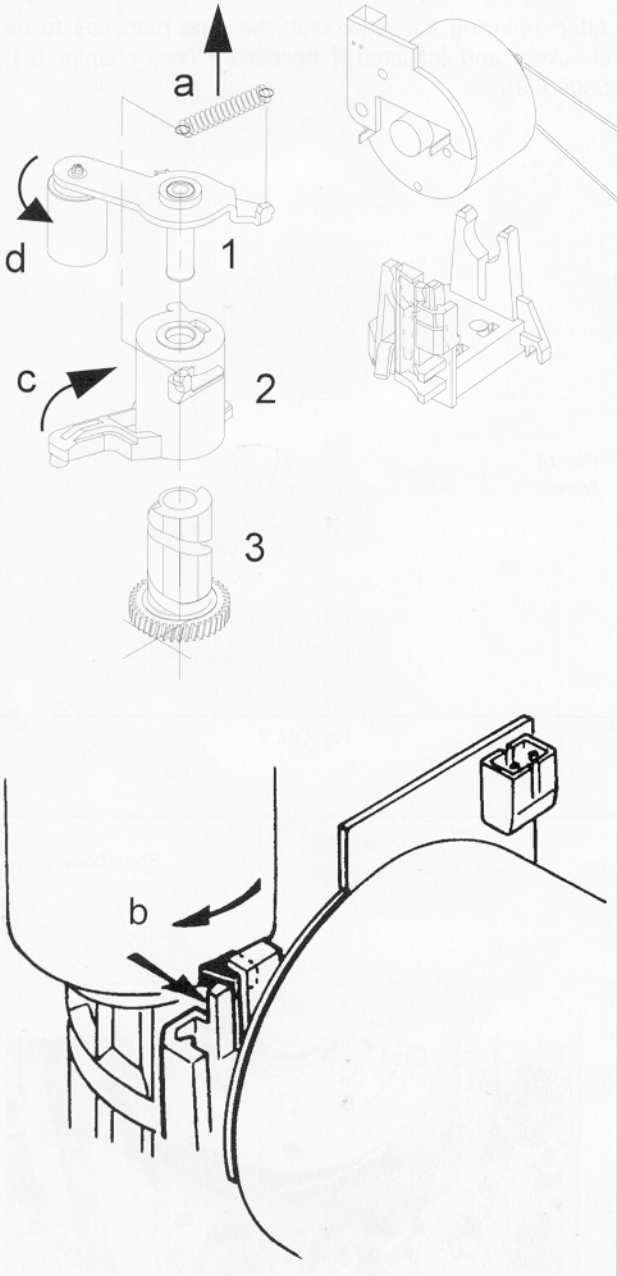


Fig. DM 3

Loading motor

- Remove the belt and disconnect the connector plug.
- Remove the loading motor from its supports.

Note:
When reassembling, ensure that the loading motor is correctly located in the front and rear supports.

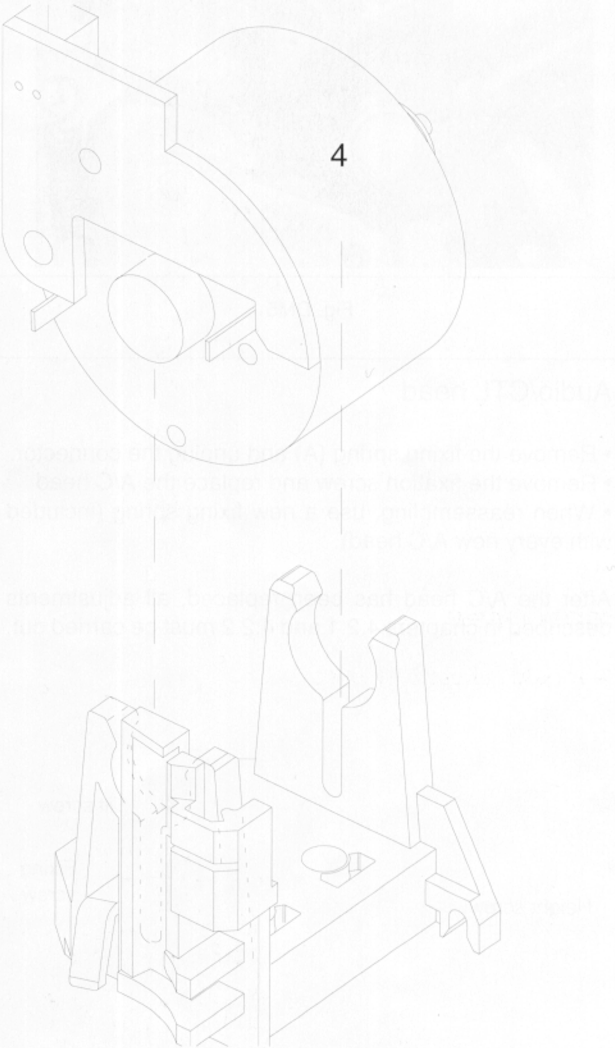


Fig. DM 4

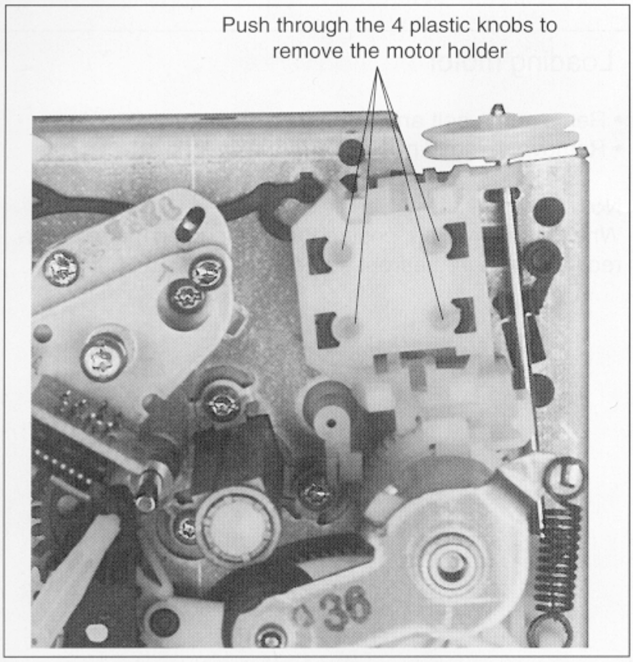

Push through the 4 plastic knobs to remove the motor holder

Fig. DM5

Audio/CTL head

- Remove the fixing spring (A) and unplug the connector.
- Remove the fixation screw and replace the A/C head.
- When reassembling, use a new fixing spring (included with every new A/C head).

After the A/C head has been replaced, all adjustments described in chapters 4.2.1 and 4.2.2 must be carried out.

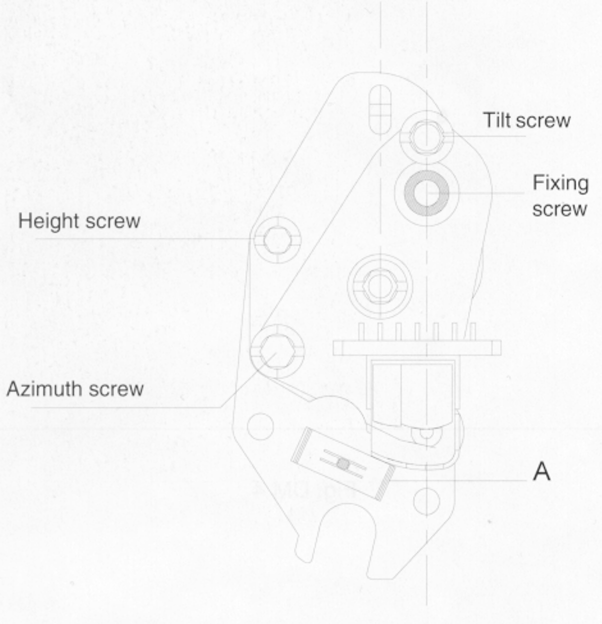

Tilt screw
Fixing screw
Height screw
Azimuth screw
A

Fig. DM 6

Right roller unit

- Set the unit to the “EJECT” position.
- Compress the two snap hooks with a pair of tweezers and remove the roller assembly from the roller unit (see fig. DM 7).
- Unhinge the right loading arm from the holding plate and push the latter towards the front of the deck to remove from the guide.

Note: During reassembling, ensure that the link from the roller is engaged in the hole of the holder plate.

After replacing the roller unit, the tape path has to be checked, and adjusted if necessary (see chapter 5.1; page 2.9).

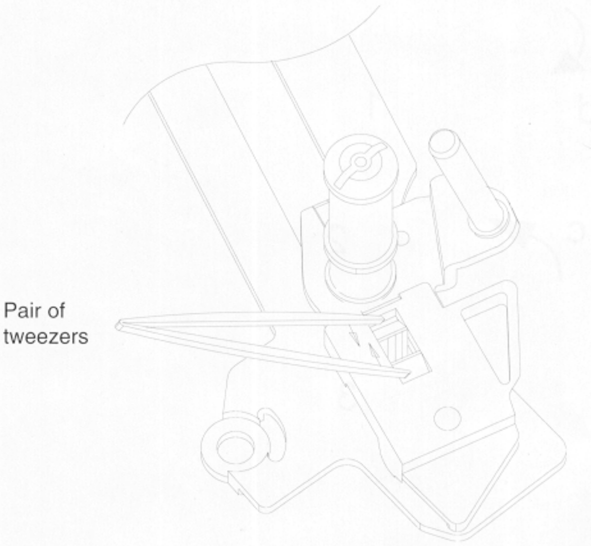

Pair of tweezers

Fig. DM 7

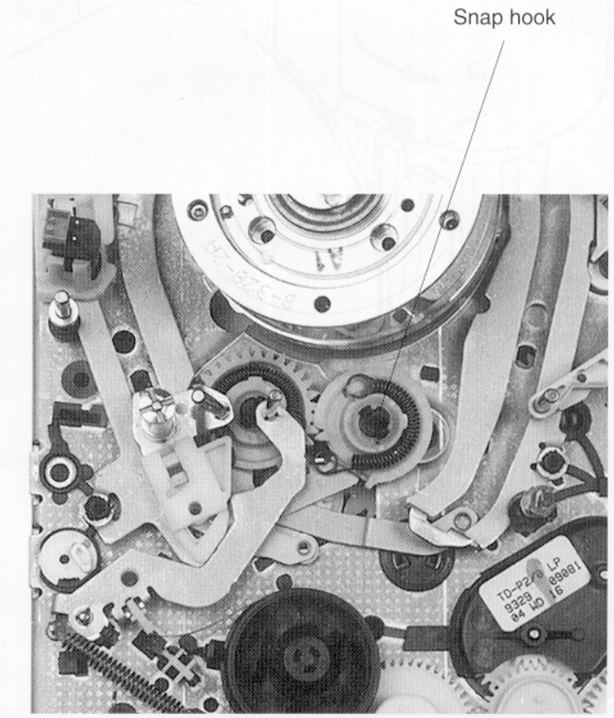


Fig. DM 8

Left roller unit

- Set the unit to the “EJECT” mode.
- Unhook the tension arm spring to avoid the tension arm from being pre-loaded.
- At the bottom side of the drive assembly, partially unhinge the sensor print and remove the tension lever.
- Compress the two snap hooks with a pair of tweezers (fig. DM 9) and remove the roller assembly (A) from the plate (B).
- Unhinge the left loading arm from the holding plate and remove it downward from the drive assembly through the recess in the chassis.
- Reassemble in reverse order.

Note: When reassembling
1. Place the carriage holding plate in the assembly with the semi-circular cutout near the rear of the deck.
2. When the holding arm is refitted, ensure the pin on the underside of the roller assembly protrudes through the link of the holding plate.

After replacing the roller unit, the tape path must be checked, and adjusted if necessary (see chapter 5.1; page 2.9).

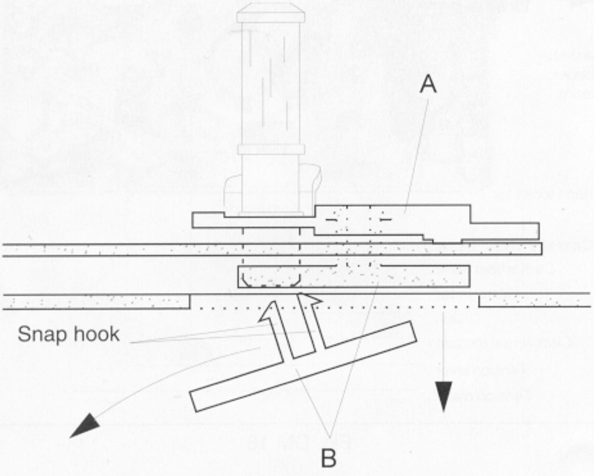

A
Snap hook
B

Fig. DM 9

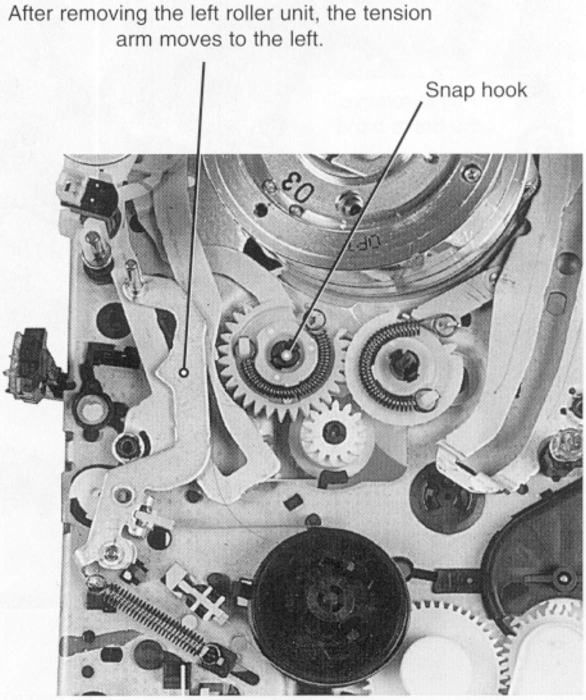

After removing the left roller unit, the tension arm moves to the left.
Snap hook

Fig. DM 10

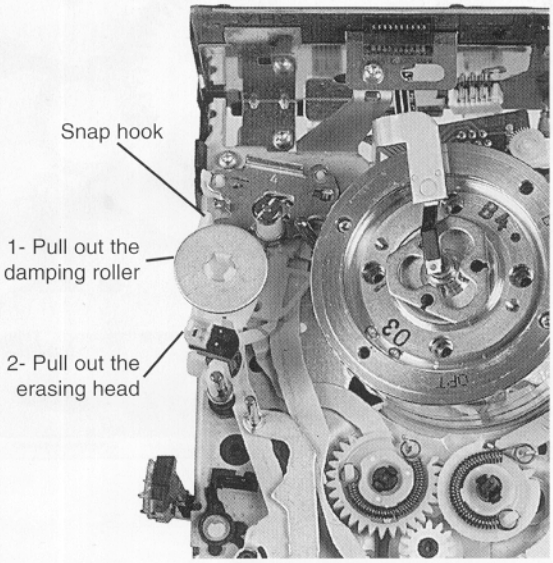

Snap hook
1- Pull out the damping roller
2- Pull out the erasing head

Fig. DM 11

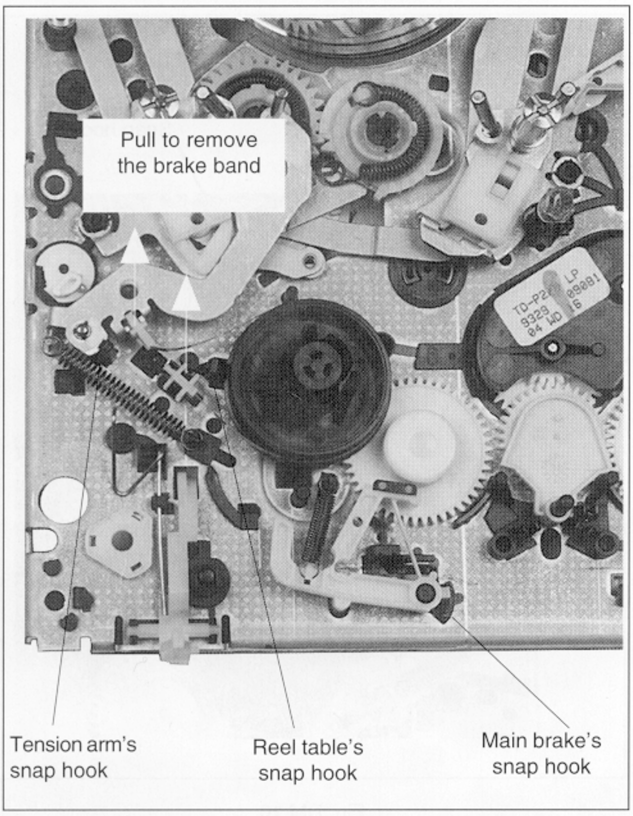

Pull to remove the brake band
TD-P2 9328 04 WD LP 09081 5
Tension arm's snap hook
Reel table's snap hook
Main brake's snap hook

Fig. DM 12

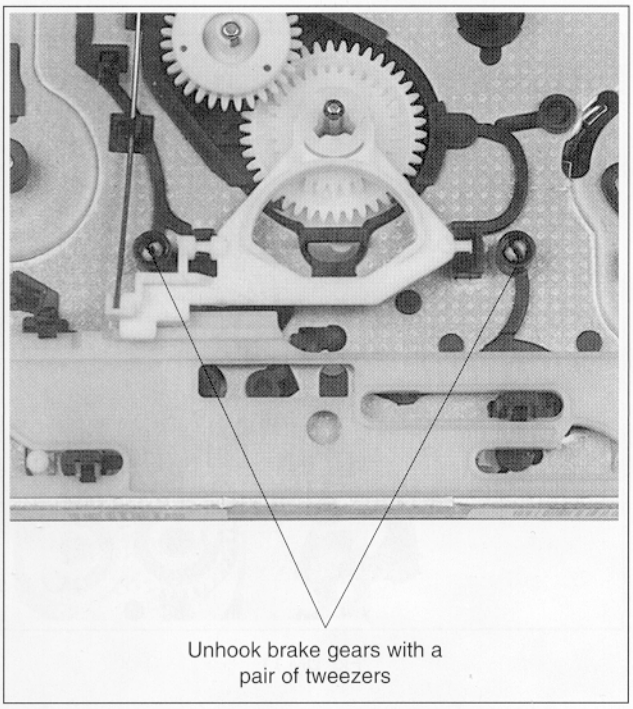

Unhook brake gears with a pair of tweezers

Fig. DM 13

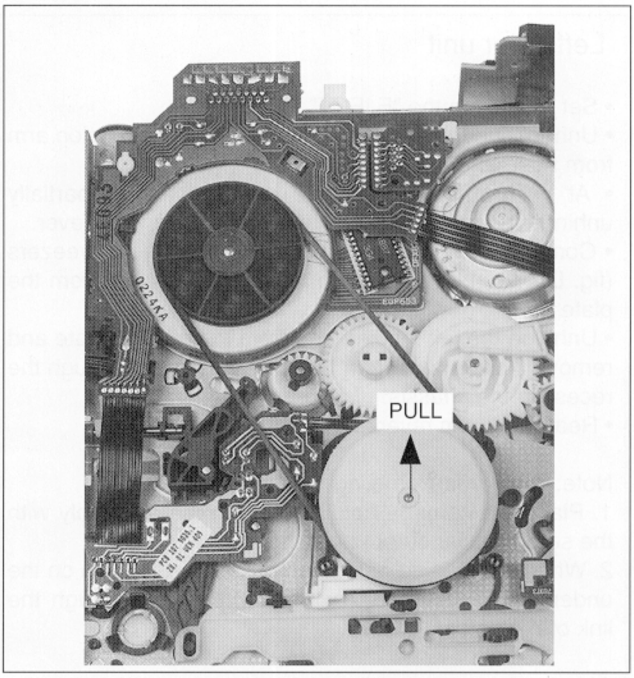

0224KA
PULL

Fig. DM 14

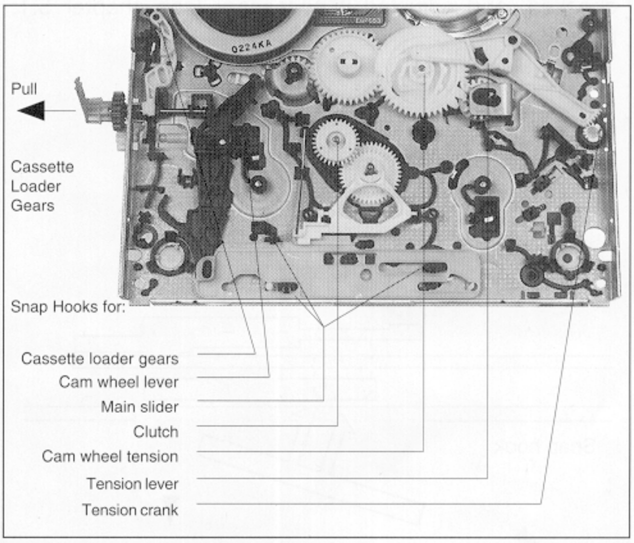

0224KA
Pull
Cassette Loader Gears
Snap Hooks for:
Cassette loader gears
Cam wheel lever
Main slider
Clutch
Cam wheel tension
Tension lever
Tension crank

Fig. DM 16

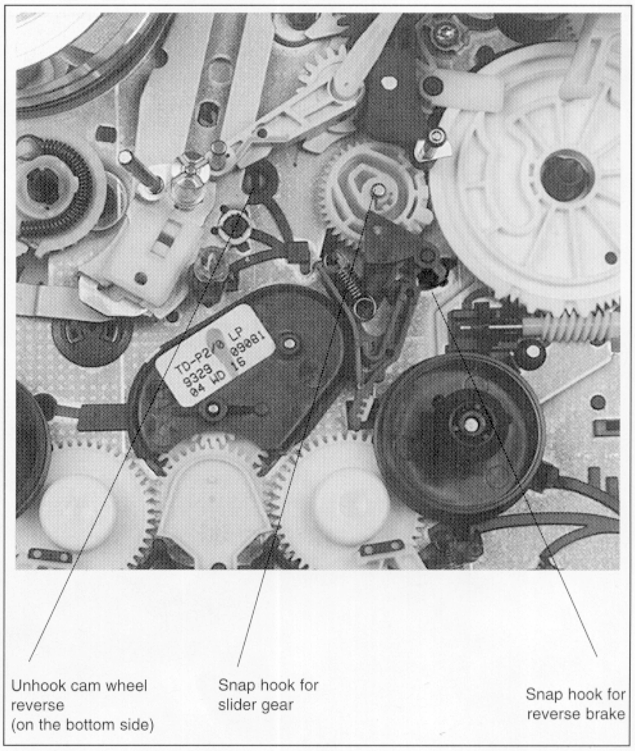
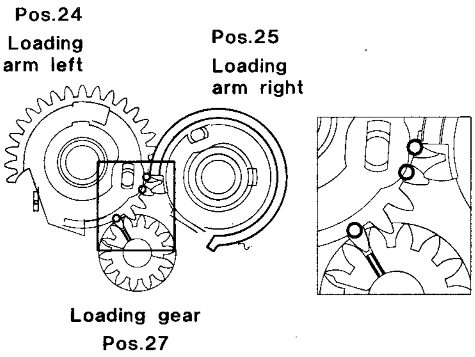

TD-P2/0 9328 04 WD LP 09081 15
Unhook cam wheel reverse (on the bottom side)
Snap hook for slider gear
Snap hook for reverse brake

Fig. DM 17

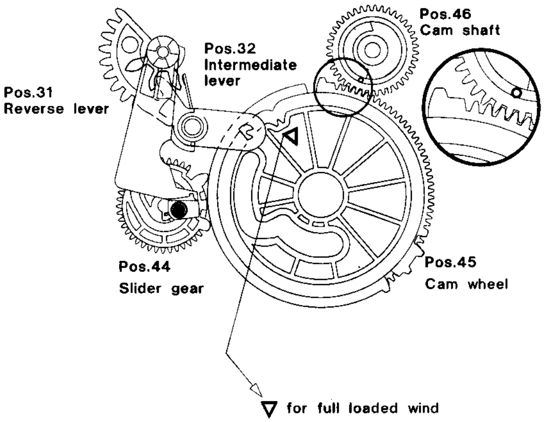
10. Mechanical alignment procedures

The deck must be in "CASSETTE DOWN" position.
The following diagrams indicate the relative position of the gear wheels and levers when the deck is in the "CASSETTE DOWN" position.

Top view 1

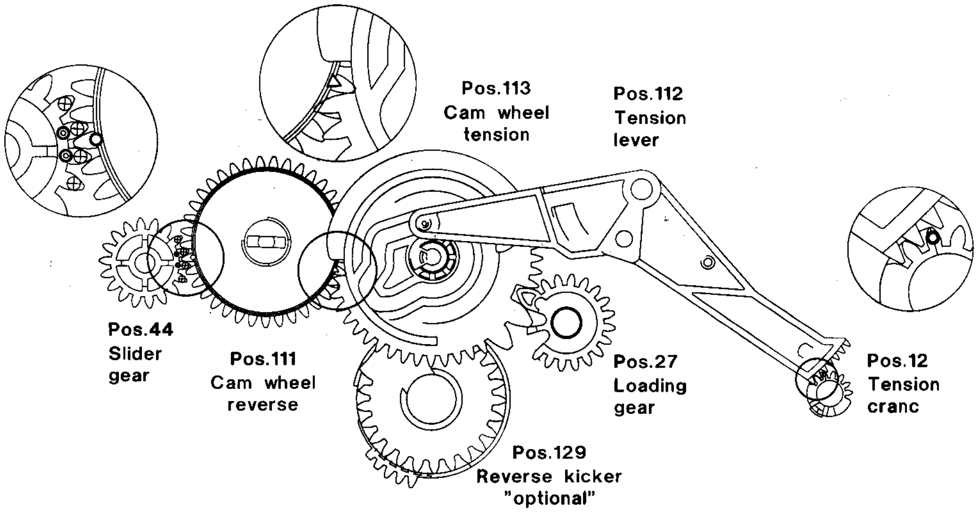

Pos.24
Loading arm left
Pos.25
Loading arm right
Loading gear
Pos.27

Top view 2


Pos.46
Cam shaft
Pos.32
Intermediate lever
Pos.31
Reverse lever
Pos.44
Slider gear
Pos.45
Cam wheel
▽ for full loaded wind

Bottom view

Underside view


Pos.113
Cam wheel tension
Pos.112
Tension lever
Pos.44
Slider gear
Pos.111
Cam wheel reverse
Pos.27
Loading gear
Pos.12
Tension cranc
Pos.129
Reverse kicker
"optional"

D. CIRCUIT DESCRIPTION

1. Large signal part

1.1 Switched-mode power supply (PS) - TVBAD (TV board)

Typical specification:

Mains voltage:	196 - 265 Vrms
Maximum output:	120 W (mono) 250 W (stereo)
Operating frequency:	75 kHz
Efficiency:	70% at maximum output. All outputs are short-circuit proof.

1.1.1 Functional principle (blocking oscillator principle)

During the conductive phase of the switching transistor, supply energy is transferred into the transformer. This energy is passed to the load in the blocking phase. Using the switch-on time, the energy transferred in each cycle is regulated in such a way that the output voltages are unaffected by changes in the load or supply voltages. The integrated circuit MC44608 (7310) controls the power MOS-FETs (7300).

Description of different load operations

a) No-load

With the wiring harness unplugged, the device runs in hick-up mode. When a voltage of +5V is connected to pin 5 on plug 1962 (signal ISTBY), the unit will go to continuous mode. The minimum load required by a power supply for stable oscillation is then drawn from the TVBAD itself (P_{in} approx. 15 W).

b) Control range

There are two operating conditions in the control range: Hick-up mode (low-power standby) and normal operation mode (Timer Record, TV mode).

In hick-up mode (P_{in} < 4 W), the power supply operates in intermittent mode. During the active phase, the capacitor for the 5V supply (2351) is loaded from the power supply and discharged via the load during the passive phase. In this operating condition, all output voltages up to 5STBY are reduced to 1/10 of the nominal value or switched off completely. This is controlled using the input voltage in the 5V controller.

In fixed frequency mode (P_{in} > 15W) the power supply oscillates at a constant frequency of 75kHz. The load is controlled using the switch-on time (switch-on time = 1/frequency x duty cycle). The output voltage is only slightly load-dependent.

c) Reversal point

Maximum output is transferred at this point of the output characteristic.

d) Overload

The power supply operates in "BURST-MODE". The energy is limited in each cycle, so that the output voltage decreases.

1.1.3 Circuit description

Interference generated in the power supply is kept out of the mains by a filter around coil 5301 (with 25" stereo units, this filter is located on the MFSWD sub-printed board). The supply voltage is rectified by bridge rectifiers 6301, 6302, 6303 and 6304 and filtered by electrolytic capacitor 2311. During the start-up phase and in "hick-up mode"), capacitor 2323 is loaded from the MC44608 control IC (7310) with a current source via pin 8 and pin 6. When the voltage reaches 14V at pin 6 of the IC 7310, the IC starts by setting the internal voltage and current references and the oscillator begins to oscillate. After the start-up phase and in continuous mode, the current source is switched off and the supply is transferred by transformer coil 8-9 and components 3322 and 6322.

The power transistor 7300 is the switching transistor for the power supply. Whilst the switching transistor is switched on, current flows from the rectified supply voltage through the primary coil of the transformer, the transistor and the shunts 3327 and 3328 to earth. As the positive voltage at pins 2 and 3 of the transformer is constant (for our purposes), the current rises linearly and forms a ramp, depending on the supply voltage and the inductivity of the primary coil. A magnetic field, representing a certain energy, forms inside the transformer. The secondary voltages are polarized in such a way that the diodes are non-conductive. The value of resistors 3327 and 3328 is used to determine the maximum transferable power. The switch-on time for the MOS-FET 7300 is determined using the current which is supplied to the control input on the MC44608 (pin 3). The output pin 5 on IC 7310 is a push-pull stage. The switch-on and switch-off currents for the MOSFET are limited by resistors 3319 and 3320.

Once the switching transistor has switched off, no more energy is transferred into the transformer. The inductivity of the transformer now attempts to maintain the current which flowed through it at a constant level (u=L*di/dt). The current, however, decreases, di/dt becomes negative, and the polarities of the voltages at the transformer reverse, causing a current to flow through the secondary coil of the transformer, the diodes, the electrolytic capacitors and the load. This current is also ramp-shaped (but reducing). The switched-mode power supply is controlled by changing the conductive phase of the switching transistor so that either more or less energy is transferred from the supply to the transformer. For the control function in normal operation mode, the output voltage Ubat is connected via the voltage dividers 3344, 3348, 3347 and 3346 to the TL431 controller (7341) which compares the voltage with an internal reference voltage of 2.5 V. The control range for the TL431 is set using resistors 3341 and 3342. Its output current (=manipulated variable) is disconnected from the supply by the optocoupler 7340, fed to pin 3 on the MC44608 (7310) and the switch-on time for switching transistor 7300 is changed accordingly. To stabilize operation in timer-rec mode, part of the 14A voltage is also used for the control function via resistor 3346. Voltage peaks occur on the transistor at the switch-off time due to the leakage inductance in the transformer. These are limited by components 2313-3311 and 6314-2309 (peak clamp network). After plugging in the power supply, capacitor 2323 is loaded via an internal current pump on the MC44608. In low power standby-mode (ISTBY = low) thyristor 6358 is enabled by transistor 7358 and connects transformer coils 16 - 15 to capacitor 2351.As this coil supplies a voltage of 100V in fixed frequency mode, which is limited to 12 V in Stdby mode by Zener diode 6341, all other voltages are also reduced by around 1/10 and therefore virtually switched off. As this also reduces the auxiliary supply voltage on the IC 7310, the MC44609 switches over to hick-up mode internally. This means that capacitor 2351 is loaded with current pulses during the switching phase via the thyristor 6358 until the current reaches a specific value in pin 3 on the control IC. It then blocks and capacitor 2351 is discharged via the load (approx. 60 mA) until control IC 7310 becomes active once more. During hick-up mode the MC44608 is supplied via pin 8 directly from the primary direct voltage on 2311. In hick-up mode the MC44608 runs through three statuses which relate to the supply voltage on pin 5 (figure 1).

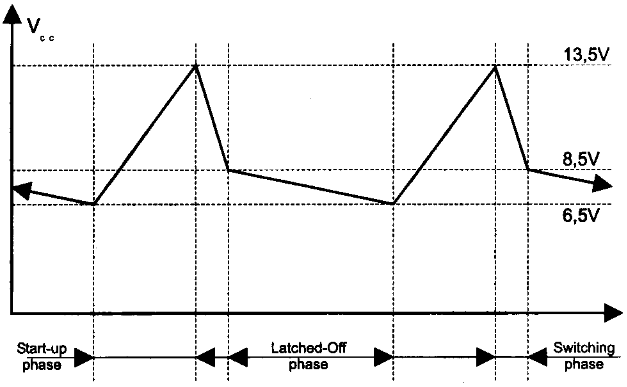


Figure 1

Switching phase: 7310 is fully active and capacitor 2351 is loaded. To prevent noise interference, the maximum current in the transformer is reduced by resistor 3330. As the amount of current consumed by the MC44608 is high in this state, the voltage on 2323 quickly sinks until it reaches 8.5 V.
Latched-off phase: 7310 no longer issues pulses to switching transistor 7300. The amount of current consumed by the control IC and therefore also the reduction in supply voltage on pin 5 can be set using resistor 3336. The repetition rate is then specified in hick-up mode. If the voltage on 2323 exceeds 6.5 V, the IC switches off completely.
Start-up phase: 7310 is switched off completely. The amount of current it consumes is so low that it can charge capacitor 2323 via an internal current source. The voltage on 2323 increases until the MC44608 starts with the switching phase once more at 13.5 V.

On the secondary side, six voltages are available, which are rectified by 6340, 6342, 6350, 6370, 6380, 6390 and filtered by 2340, 2351, 2360, 2353, 2370, 2380 and 5370, 5360.
The voltages 5STDBY, 5AD and 3V3 are additionally stabilized using voltage regulators 7381, 7382, 6387, 6383, 6384, 6385, 3383, 3384, 3385, 3386, 3388 and 7391, 7392, 7393, 6392, 3393, 3397, 3395, 3396 and 7370, 7371, 6373, 6372, 6374, 3370, 3371, 3372, 3373, 3375. Whilst the device is in low power stand-by mode, the 5AD voltage is switched off via the regulator.
The 33A voltage is also stabilized by Zener diode 6355 and transistor 7355.
Overvoltage
MC44608 7310 has overvoltage protection. When the voltage at pin 1 exceeds 15.4 V, the output stage blocks.
Overtemperature
MC44608 7310 also has an overtemperature sensor, which blocks the logic in case of excessive chip temperature. A renewed start-up is possible once the temperature has dropped. To reactivate the power supply, unplug the supply and then plug in again.

1.2 Large signal processing (TV,LS,PT) - TVBAD

The following functional units form part of the "large signal" functional group:

- TV-IC (IC7205) controlled using I²C bus
- Horizontal deflection stage
- East-West image geometry correction stage
- Vertical deflection stage
- RGB stage
- Beam current feedback stage
- Picture tubes
- Circuit breaker

1.2.1 TV-IC TDA884x (IC7205) controlled using I²C bus

The TV-ICs used are from the TDA 884x family which can process various television standards depending on the device type. These ICs are sub-divided into ICs with and without East-West image geometry processors.

The following functional blocks are used for large signal processing:

- Sync pulse separation from the video signal selected
- Horizontal synchronization via two PLL control loops
  a) φ1 control loop to achieve frequency synchronization with the video signal. The control voltage produced is filtered on pin 43.
  b) φ2 control loop to adjust the phase angle of the screen content relative to the grid on the screen. The control information is output on pin 40 (H drive). The feedback signal (HFB) is input on pin 42.
- Horizontal soft-start and soft-stop function
- Soft start: For the first 100ms, the horizontal oscillator functions at 32kHz and then switches over to 16kHz. The soft start reduces the switch-on current peaks when starting up the horizontal deflection stage.
  Soft stop: The horizontal oscillator switches from 16kHz to 32kHz line frequency. In addition, the RGB outputs on pins 19, 20 and 21 are notched up to achieve a partial discharge of the picture tube. The soft stop period is dependent on the beam current and can last up to 100ms. The high voltage in the picture tube is therefore reduced to below 10kV and thus effectively suppressing the cold-cathode emissions (persistence after the picture tube has been switched off)
- Vertical divider: Synchronizes itself according to the vertical sync pulses and determines the scan time and the ramp-down time for the vertical ramp.
- Vertical saw-tooth voltage generator: Supplies symmetrical saw-tooth currents to pins 46 and 47. The steepness and the curved s-shape of these currents can be changed to a limited extent using the I²C bus.
- Beam current limiting stage: Evaluates the voltage available at pin 22 thus engaging and reducing the amplification in the brightness and contrast amplification which reduces the output voltages for the RGB stage on pins 19, 20 and 21.
  Voltage on pin 22 >= 3.5V: Not involved in the brightness and contrast amplification stage.
  Voltage on pin 22 between 2.5 and 3.5V: Contrast is reduced.
  Voltage on pin 22 between 1.5 and 2.5V: Brightness and contrast are reduced.
  During the vertical frame flyback time (approx. 0.8ms) the voltage on 22 needs to be < 3.65V, whereas the vertical scan time (approx. 19.2ms) < 3.65V. If these voltage values do not apply, this status is evaluated as an error in the vertical stage and the RGB output voltages on pins 19, 20 and 21 become as small as possible (RGB is blanked). This information is forwarded to the main controller (IC7900) via the I²C bus, and the controller then switches off the horizontal driver stage in the TV-IC via soft-stop. This state protects the screen against excessive local heating if the vertical stage is defective (screen burn protection).
- Circuit-breaker evaluation and high voltage compensation stage: Evaluates the voltage level on pin 50. Voltages > 3.9V indicate a fault in the large signal range. If this level is exceeded, the horizontal output stage is stopped immediately, preventing reloading of the screen. Voltages between 1.5 and 2.5V on pin 50 engage and correct the vertical ramp. (Changes the vertical amplitude or with the TV-IC with East-West correction stage, the horizontal width by a maximum of ±5%).
- East-West image geometry processor: Derives from the vertical ramp a parabolic voltage which issues a control current on pin 45 for the subsequent East-West correction stage. The geometry processor can be operated in the service menu via the I²C bus and the parabolic voltage can be changed for the following image geometry corrections: East-West range, parabolic range, corner, parabolic and trapezoidal correction.

- RGB functional unit with automatic black level and colour temperature stabilization:
  The black level and colour temperature stabilization corrects changes in the picture tube relating to high voltages and ageing. The video signal present on pin 10, 13, 17 or 22 is separated into the Y and chroma parts in the TV-IC, runs through various functional blocks depending on the TV standard, and can then be changed using the I²C bus in terms of brightness, contrast, definition and colour temperature. It is set automatically in 4 measurement lines, which are present following the V pulse, for each picture tube in succession.

1.2.2 Horizontal deflection stage

T7219, T7501 and transistor 5500 or 5501 are used as the driver stage for line transistor T7520 or T7521. During the conductive phase, the primary current for the line transformer L5519 or L5520 and the horizontal deflection current flow via T7520 or T7521. During the block phase, the energy stored in the line transformer is used to generate the high voltage and for the horizontal line flyback. In the subsequent scan phase, the horizontal deflection current changes polarity and is clamped to earth via the diodes D6520(14"), D6521(20", 21") and D6521 and D6522 (25"). The feedback voltage on the line transistor is supplied to the TV-IC on pin 41 via an RCD network. The TV-IC then uses this information for RGB blanking during the line flyback and as control information for the φ2 control loop.

1.2.3 East-West image geometry correction stage (only for 25" units)

The TV-IC 7205 passes a parabolic-shaped control current from pin 45 to the current sink located in the vertical IC TDA8350 (IC7556). This sink current is drawn from the diode modulator (comprising D6521, D6520, C2520, C2522, C2526, the bridge transformer L5525 and decoupling coil L5526) which in turn draws its current from the horizontal deflection unit. It is possible to control the image width by changing the deflection current flowing through the horizontal deflection unit.

1.2.4 Vertical deflection stage

TDA8356 (IC7555) for 14", 20", 21" and TDA8350 (IC7556) are ICs coupled to direct current with integrated bridge output stage and integrated non-return switch. It is controlled from the TV-IC via pins 46 and 47. The status of the V-IC is conveyed to the TV-IC via an RD network (R3567, R3568, R3569 and D6568).

1.2.5 RGB stage

The RGB signals are sent to the picture tube printed board from the TV-IC (IC7205), their voltage is amplified at the board using T7180, 7181 and 7182, the current is buffered once again via the subsequent push-pull stages and supplied to the picture tube cathodes via resistors R3177, 3179 and 3181. After each vertical frame flyback, T7185, 7186 and 7187 supply measurement signals for automatic cathode calibration to pin 18 on the TV-IC.

1.2.6 Beam current feedback control stage

The voltage on root capacitor C2535 is a precise reflection of the total of cathode currents flowing. This information is conveyed TV-IC (pin 22) to the TV-IC (pin 22) which controls the brightness reduction stages internal to the TV-IC according to the voltage values.

1.2.7 Picture tubes

The 14" (A34...), 20" (A48...) and 21" (A51...) picture tubes are tubes with a 90" deflection angle and do not require grid corrections, i.e. no image geometry correction stages are necessary. The 25" picture tube (A59....) is a tube with a 110° deflection angle and requires a horizontal pin-cushion equalization stage.

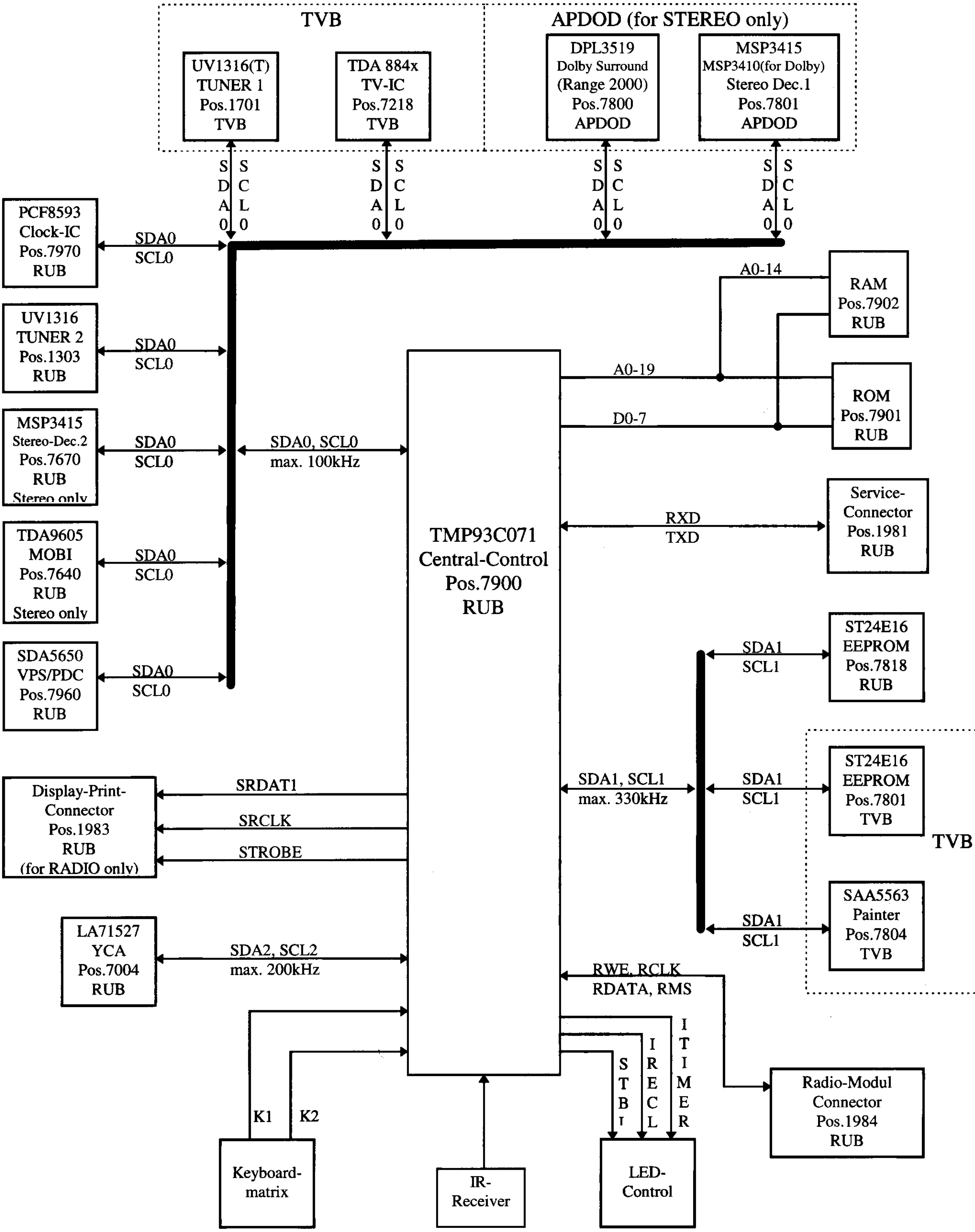
1.2.8 Circuit breaker

T7543, T7547 and T7510: The circuit-breaker input is located on the TV-IC on pin 50. This is evaluated approx. 500ms after switching on the device. In normal operation, approx. 2V is available on pin 50. In case of error, a high level of at least 100ms duration is required. The voltage value must be > 3.9V. The stage with T7510 responds when the line transformer primary current is too great, the stage with T7543 responds when there is a risk of excess high voltage, and the stage at T7547 responds when the beam current is too high.

2. Small signal part

2.1 Control part (AIO1,AIO2,CVB) - RUBAD

Block diagram for sequence control system (central control):


TVB
APDOD (for STEREO only)
UV1316(T) TUNER 1 Pos.1701 TVB
TDA 884x TV-IC Pos.7218 TVB
DPL3519 Dolby Surround (Range 2000) Pos.7800 APDOD
MSP3415 MSP3410(for Dolby) Stereo Dec.1 Pos.7801 APDOD
SDA0
SCL0
PCF8593 Clock-IC Pos.7970 RUB
UV1316 TUNER 2 Pos.1303 RUB
MSP3415 Stereo-Dec.2 Pos.7670 RUB Stereo only
TDA9605 MOBI Pos.7640 RUB Stereo only
SDA5650 VPS/PDC Pos.7960 RUB
SDA0, SCL0 max. 100kHz
TMP93C071 Central-Control Pos.7900 RUB
A0-14
A0-19
D0-7
RAM Pos.7902 RUB
ROM Pos.7901 RUB
RXD
TXD
Service-Connector Pos.1981 RUB
SDA1
SCL1
ST24E16 EEPROM Pos.7818 RUB
SDA1, SCL1 max. 330kHz
ST24E16 EEPROM Pos.7801 TVB
TVB
SAA5563 Painter Pos.7804 TVB
Display-Print-Connector Pos.1983 RUB (for RADIO only)
SRDAT1
SRCLK
STROBE
LA71527 YCA Pos.7004 RUB
SDA2, SCL2 max. 200kHz
RWE, RCLK
RDATA, RMS
Radio-Modul Connector Pos.1984 RUB
K1
K2
Keyboard-matrix
IR-Receiver
STBI
IRECL
ITIMER
LED-Control

2.1.1 Overview of functions:

The control of the entire TVCR combined unit primarily determines the "all in one" (AIO) central controller TMP93C071 (IC7900), which monitors peripheral functional groups using I²C bus (SDA, SCL). Communication with the TXT,OSD-IC (Painter) SAA5563 (IC7804) on the TVBAD is conveyed via lines SDA1 and SCL1.
The sequence control system can be divided into the following functional groups:

- Main computer (central controller) with external memory and parallel RAM
- Bus systems
- Shift register
- EEPROM
- Reset generation
- Keypad evaluation
- LED control
- IR receiver
- Clock IC
- Loading motor detection

2.1.2 Main computer

The micro controller (µC/AIO) TMP93C071 IC7900 carries out the main control functions on the device. As the µC has no internal memory, an external EPROM or flash-ROM (IC7901) with a memory size of 512 Mbytes is required. As the µC's internal RAM is not sufficient at 8kBytes, an external static RAM (IC7902) is used. The memory size is 256 kBits .

- External ROM sector of 16Mbytes addressable
- 8 Kbytes internal RAM
- 8-bit A/D converter (16 channels)
- Serial bus interface: 2 serial, 2 I²C bus, 1 UART (RXD/TXD)
- PWM outputs: -3 x 14bit, 9 x 8bit
- Composite sync input
- Special servo inputs

The component is used in QFP (120 pins).
There are 16 analog inputs available. The resolution of the A/D converter is 8 bits. The maximum input voltage range which can be processed is 0 ... 5V (determined by the reference voltages ADREF pin12 and ADGND pin13).
12 analog/PWM outputs - 3 with 14-bits and 9 with 8 bit resolution, are available. The outputs supply a signal with a constant frequency (approx. 39kHz) and a variable duty cycle.

External RAM CY62256D (7902)

An external RAM of 256kBits (32k x 8bits) in size is used.

External flash ROM M29F040-90P1 (7901)

The external flash ROM has a memory capacity of 4Mbits (512k x 8bits). It contains both the controller software for the entire sequence control system for the device, and what is known as the "boot software". This can be used to overwrite the controller software using an RS232 interface for a new version. For this purpose there is a service connector (pos. 1981) on the underside of the device, which can be used to connect the TVCR to a PC via an interface. Each time the network is reset, the boot software is active for 50ms and attempts to create a connection to the PC before the device is restarted.
See the Settings chapter for more details on the software update.

2.1.3 Bus systems

a) I²C bus for peripheral functional groups

SDA0, SCL0:
This bus is operated at a pulse frequency of approx. 100kHz. The following modules are connected:

- CLOCK-IC (IC7970) PCF8593P (RUBAD)
- VPS/PDC-IC (IC7960) SDA5650 (RUBAD)
- TUNER 1(1701) UV1316 (TVBAD)
- TUNER 2(1301) UV1316 (RUBAD)
- MOBI (IC7640) TDA9605H only for stereo (RUBAD)
- MSP (IC7670) MSP3415D only for stereo (RUBAD)
- TV-IC (IC7205) TDA 8840/8842 (TVBAD)
- MSP (IC7801) MSP3410/3415 (APDOD)
- DOLBY-IC (IC7800) DPL3518/3519 (APDOD)

SDA1, SCL1:
This bus is operated at a pulse frequency of approx. 330kHz. The following modules are connected:

- EEPROM (IC7818) ST24E16(RUBAD)
- EEPROM (IC7801) ST24E16 (TVBAD)
- TXT, OSD (PAINTER) (IC7804) SAA5563 (TVBAD)

SDA2, SCL2:
This bus is operated with an individual pulse frequency (synchronized using HP1) so that no interference is generated in the image. The following module is connected to this bus: YCA (IC7004) LA71527M

b) Serial bus to the service plug

Service information can be called up on plug 1981 via RXD and TXD. (e.g. re-programming flash ROM and RS232 interface)

c) Optional for devices with radio display: Serial bus for the shift registers

Via the SRDAT and SRCLK lines, data is loaded into the shift register with a serial input and parallel outputs and switched onto the shift register outputs by the transfer pulses coming from the STROBE line (see description of KB1D).

d) Optional for devices with radio: Serial bus

RCLK_MNT2, RDATA_PSS2: Interface to the radio module

2.1.5 EEPROM

The IC7818 (16Kbit) on the RUBAD stores timer data, channel information, device settings, SHOW VIEW data and data for the child-lock, for example, using the I²C bus.

In the IC7801 (1Kbit) on the TVBAD, setting values are stored using the I²C bus required for the production of the TVBAD board.

2.1.6 RESET generation

For generating the reset, a discrete switch is used where the reset length and the rising edge can be adjusted using two capacitors.

2.1.7 Keypad evaluation

Using a resistance network a voltage divider is generated depending on the key pressed via resistors pos. 3945 and 3946. This voltage divider generates a specific direct voltage value on line K1 or K2 which is detected using the analog inputs AIN7/pin 18 (K1) and AIN9/pin20 (K2) on the µC 7900.
Alternatively, the keys can also be located on a separate printed board (KB1D or KB2D). In this case the lines K1 and K2 are only fed to the KB1D printed board via plug pos.1983 or to the KB1D printed board via plug pos.1982. The direct voltage value is then generated on lines K1 or K2 and evaluated on the keypad printed boards once more using the keypad and resistance, and evaluated on the RUBAD.
Die Tasten können alternativ auch auf einem eigenem Print (KB1D oder KB2D) sitzen. In diesem Fall werden die Leitungen K1 und K2 lediglich über den Stecker Pos.1983 zum KB1D-Print oder über den Stecker Pos.1982 zum KB2D-Print geführt. Auf den Tastenprints wird dann wieder über Taste und Widerstand der Gleichspannungswert auf den Leitungen K1 oder K2 erzeugt und am RUBAD ausgewertet.

2.1.8 LED control

a) STBY-LED

The red STBY-LED can be lit in 2 different brightness levels. In standby mode it is less bright than in the normal operating mode, and it will also flash when remote control signals are being received. It is controlled using the STBL signal (µC 7900 P66/ pin 98).
STBL low = standby mode (LED less bright)
STBL high = normal operation (LED bright)
Alternatively, the STBY-LED may be located on a keypad printed board (KB1D or KB2D).

b) TIMER-LED

The red timer LED is switched using the control line ITIMER and displays whether or not a timer has been programmed. If the ITIMER control line is High, the TIMER LED does not light up; if the ITIMER control line is on Low, the TIMER LED lights up. Alternatively, the timer-LED may be located on a keypad printed board (KB1D or KB2D).

c) RECORD-LED

The RECORD-LED is controlled using the IRECL control line. If control line IRECL is High, the RECORD-LED will not light up; if the control line IRECL is Low, the RECORD-LED will light up. Alternatively, the RECORD-LED may be located on a keypad printed board (KB1D or KB2D).

2.1.9 Display printed board KB1D (only for devices with radio)

2.1.9.1 Display board

Overview of functions:
The 7 segment display is controlled using a serial bus and the supply to the segments is ensured by line DISSUP. The customer can select various brightness levels in the various operating modes.
The sequence control system can be divided into the following functional groups:

- Shift register (IC7111,7121,7131,7141) HEF4794BT
- 7 segment LED display

Shift register
Via lines SRDAT1 and SRCLK (serial bus) the data is loaded into the shift register (pos. 7111, 7121, 7131, 7141) using serial inputs and parallel LED driver outputs. Using the rising clock edge (SRCLK) the data from SRDAT1 is transferred and conveyed using EO (Enable Output) on high, directly to the outputs using the rising strobe edge.

7 segment LED display
The 4-figure LED display LTC-5837BG (pos.7130) can be operated at 4 different brightness levels. The display is supplied with DC via line DISSUP, and a change in voltage on the DISSUP indicates a change in the display brightness. All segments have a common anode which is run to pins 3, 8, 18, 23, 28, 33 and 38. The individual segments are controlled directly using shift register outputs so that a LOW position on the shift register output activates the corresponding display segment.

2.1.9.2 Keypad

see Keypad evaluation

2.1.9.3 LED control

Alarm Radio Sound LED
The Alarm Radio Sound LEDs (pos. 6183, 6184) are controlled by the shift registers in such a way that a LOW position on the shift register output activates the corresponding LED.

Record, Timer, Stby LED
see 2.1.8 LED control

2.1.10 IR receiver

Using the IR receiver (IC7810), the IR commands sent by the REMOTE are received, converted, and fed to the c central controller on pin 29.

2.1.11 CLOCK IC

The CLOCK-IC supplies the time information and continues to be supplied with a back-up voltage even if the device is either unplugged or switched off at the mains plug. This also means that the clock function is maintained if the device is switched off for at least 30min or 4 days (depending on the back-up capacitor 2970 or 2971).

2.1.12 Threading tachometer detection

So that the device can also detect when a cassette is inserted in low-power standby mode, the threading tachometer is detected using a comparator (IC7800-A) and fed to the µC.
This indicator is used to "wake up" the device from low power standby.

2.1.13 Buzzer function

When programming the timer, the signal TWB is set to LOW, which loads an 1000uF electrolytic capacitor. This electrolytic capacitor (pos. 2994) is discharged via a piezo element (buzzer) if the power supply is interrupted or if the mains switch is activated, and this produces a timer warning signal.

2.2 Control section on the TV board (COTV) - TVBAD

Micro-controller (Painter)

The microcontroller IC SAA5563 (pos. 7804) comprises one microprocessor group and a Teletext group. This IC is used to realize a port expander as well as Teletext, VPS-PDC and OSD.
The SAA5563 is controlled by the I²C bus SDA1 (pin50) and SCL1(49). Control line ITXTINTCO is used as an additional communication line. It indicates when a further transmission may be sent to the SAA5563.
TVBAD control (port expander)
The ports controlled by the microprocessor are either arranged as outputs for control lines (pins 3, 4, 5, 6, 7, 11, 12, 17, 18, 19, 46, 47, 48, 51 and 52), as PWM ports for pulse-wide modulated signals for setting the volume for mono devices (pin1) or in devices with a radio function to output the timer-buzzer alarm signal (pin2).
pin9 is used as a read-in port for the AGC voltage from tuner1 and pin10 for reading in pin8 from SCART1.
TELETEXT, VPS-PDC (data decoding)
The Painter decodes the following file types from CVBS (VTV or VPDC): WST Teletext (625/525), Closed Caption, VPS, WSS. The extracted data is stored either in the memory interface or in the special function registers (SFR). The time can also be read from the TXT header line or from the PDC format1 (for "Time download").
The following modes (data formats) are identified:

- VPS (Timer data and sender name)
- PDC Format 2 (Timer data and sender name)
- PDC Format 1 (sender name and date)
- TXT header line (time for "Time download")

OSD
Display
The data to be displayed from Teletext pages or from OSD pages are written to the memory interface. The display unit generates the required RGB signals (RTXT, GTXT and BTXT) and the fast blanking signal VDS (BLTXT). The RGB signals and the fast blanking signal are fed to the IC7205 (TV-IC).
Synchronization
The display is synchronized with the IC7205 (TV-IC) using the horizontal sync (HFB/ pin36) and the vertical sync (VGUARD/ pin37). Due to this external synchronization, the display for Painter

is in "Slave Sync Mode". All display timings are derived from these signals. No artificial sync is generated due to the slave sync mode. The VDS output (BLTXT) on pin 35 means that subtitles can also be used.

For devices with 2 tuners, the VPS/ PDC decoder-IC7960 SDA5650 on the RUBAD is used to decode the VPS/ PDC data. This reads the data from the vertical blanking gaps and supplies it to the controller via the I²C bus SDA0 and SCL0.

2.3 Deck electronics (DE) - RUBAD

2.3.1 Deck interface SAA 1310

a) CTL stage

The IC SAA1310 (IC7443) contains a write/read stage for the CTL track, providing the option of overwriting an existing CTL track free of interference (e.g. if another index code is written onto the tape in Play mode). The playback stage is equipped with a "digital" two-stage AGC. This logic circuit identifies the size of the output signal supplied by the CTL head via comparators, and then selects the best amplification ratio in the playback stage using comparators.
Note: The playback signal follows the law of induction (di/dt) and is therefore largely proportional to the tape speed. It can therefore vary considerably from the maximum speed v_{max} in the FAST SEARCH mode to v_{min} in the LP mode (slowest tape speed). To ensure that the pulse-interval ratio of the tape sync is always correctly reproduced with the conditions given above, the amplifier must not be overdriven. The two-stage AGC alone cannot cover the large dynamic range of the input voltage. The amplifier is therefore also equipped with an internal low pass characteristic (f_g=3kHz typ.).
The amplification is also influenced using transistor T7442 and resistor R3452. The transistor is purposely inversely polarized because the inverse operation has better damping properties for this application. If T7442 is blocked (WIND mode), the external resistor R3448 is located in the feedback loop which reduces the amplification. The short-circuiting of R3452 with T7442 (in PLAY and REC) increases the amplification in the following ratio; g_{on} / g_{off} = 1+R3452 / 100. The RC cell C2473 and R3454, connected in parallel with the CTL head, together with the CTL head inductance, causes a resonance step-up around 10 kHz. R3454 produces a steep fall in the frequency transmission characteristic beyond the resonant frequency, providing an efficient suppression of stray high frequency pick-up. The CTL head signal amplitude in SP is around 1 to 2 mV_p. This means that the gain of the playback amplifier has to be correspondingly high. To avoid offset problems, a 47µ electrolytic capacitor (C2471) is inserted in the negative feedback branch for DC decoupling. Together with the internal 100Ω feedback resistor, this electrolytic capacitor acts as a high pass filter. Its capacity must be large enough to ensure that the differentiating effect is beyond a cut-off frequency, where the distortions of the signal shapes remain negligible at the lowest tape speeds. Otherwise overshoots could occur after each change of magnetism on the tape, resulting in faulty triggering of the internal logic and therefore in faulty sync signals.
The W/R (Write/Read) signal is used to switch over between record and playback:

- W/R "high" > Record
- W/R "low" > Playback.

The SYNC line on pin 16 is bi-directional. In Rec. mode, a rectangular signal with a period of 40 ms is generated by the TVC (24ms high,16ms low) and fed to the CTL IC on pin 16 (=SYNC). The recording amplifier in the SAA1310 converts this voltage into a recording current of approx. ±2mA.
In playback mode, the corresponding sync signal from the tape, pre-amplified by the CTL stage in the SAA1310, is output to pin 16 and fed to the AIO. pin 3 in the SAA 1310 is the buffered output of the IC's internal 2.5V reference voltage (±0.1V).

b) Sensor interface

The four comparators in the SAA1310 are used to convert the analog signals to the logic level. Two of these comparators have open collector outputs (pins 11 and 13), which can switch a current of 100 mA. The outputs are overload protected by a current limiter and thermal overload protection. Only the non-inverting input on each comparator is accessible from the outside. The other inputs are connected to an internal reference of 2.5V. The hysteresis of the comparators is set internally to approx. 10mV.
The following sensors are evaluated:
WTR (Winding Tachometer Right)
Comparator 2 (In WTR/pin 6; Out WTRD/pin 14)
This signal comes from a reflected light barrier. The output amplitude of the sensor must have a minimum variation of between 2V and 3V to ensure correct evaluation.
WTL (Winding Tachometer Left)
Comparator 3 (In WTL/pin 7; Out WTLD/pin 13)
This signal is required for the turbo functions. It functions in the same way as the WTR stage.
FG (Capstan Tachometer)
Comparator 4 (In FG/pin 8, Out FGD/pin 11)
The amplitude for this virtual sinewave signal is approx. $1V_{pp}$. The minimum acceptable level is $300mV_{pp}$. The signal is AC-coupled via C2490. This means that input pin 8 is connected to the reference voltage pin 3 via resistor R3456 (bias current and DC offset). R3456 together with C2474 creates damping to prevent high frequency interference. However, R3456 and R3470 also create a voltage divider which suppresses the signal (by approx. 0.8dB).

2.3.2 Head drum motor driver

DRUM: Speed/phase - control signal (14 bit resolution).
PG/FG: Combined POS/tachometer signal (comes from the TDA5241).

The current consumption from the 14M line is typically 70mA, which rises to approx. 0.5A when starting the motor. The head disc control voltage (speed and phase information) is output via the DRUM control line. This pulse-wide modulated signal is fed to the head drum motor driver IC TDA5241 (7446/pin 13) and integrated with capacitor C2492. This IC already has a completely integrated 'start-up' circuit fitted. For the commutation, the head drum motor driver uses the e.m.f. on the non-current carrying motor coil (transformer principle). The motor speed is also discharged from there at the same time. The phase of the head disc is discharged from a position coil. Speed and phase are combined into one signal (7446/ pin 6 -"PG/FG"). During this process the falling edge of the signal is the speed (FG/450Hz) and at 25Hz the position pulse (PG) has a positive edge. The connection from the HMO driver TDA5241 [7446] to the head drum motor is made using plug connector pos948.

2.3.3 Interface to the capstan motor:

The capstan motor on the tape deck is connected via connector 1946. CAP is the signal for controlling the Cap speed; it is a voltage which can vary between 0 and 5V without load. By means of CREV (Capstan REVerse) the direction of motor rotation can be changed (high = reverse). The capstan motor is supplied via line 9_14M2 (14V). The maximum current consumption is limited to 1A. Typical values in playback mode are approx. 0.2 to 0.3A. The capstan tachometer FG is connected directly to the sensor interface. It comes from a Hall sensor and is pre-amplified on the printed board for the capstan motor.

2.3.4 Loading motor driver:

The driver for the loading motor uses a bridged dual power op amp (IC7440, L2722). This IC can supply an output current of ±1A. All the outputs are overload protected using diodes (flyback diodes). Between the IC outputs (pins 1 and 3), a "Boucherot" circuit (1Ω/ 100 nF) suppresses any spurious 3MHz oscillation from the output stage. The output current is limited by the impedance of the loading motor (typ. 18Ω) when starting up or if the motor is blocked. One half of the bridge is controlled via the TMO line and acts as a comparator. The other half is an amplifier integrator with V_u = 3.9. A change in the input voltage (THIO) of between 0 and 5V results in a change in the output voltage of between 0V and almost Ub. With 50% modulation (THIO = 2.5V) there are approx. 7V on pin 3. C2478 integrates the 39kHz PWM signal. The polarities of the comparator (non-inverter) and the opamp (inverter) are selected as follows:

- During a Power On Reset, the AIO switches the THIO line to "Low" and TMO to "High". These polarities must be observed to ensure that the motor is not activated during a POR pulse.
- When there is a loss of the 5V supply, a separate reference divider (3451/3457) is used for the comparator section. Both outputs on L2722 are then in "common mode", thereby protecting the motor.

2.3.5 LED control for Tape End/ Tape Start Detection

The LED current is switched using transistor at pos. 7808. The ON time is approx. 1 msec with an ON/OFF ratio of 0.09.
The LED current is normally 150 mA. In order to prevent interference from the relatively high pulsed current 'spreading' through the entire unit, the LED is fed from the 14M1, and filtered by 2 NFRs [3805, 3812] with 10 Ω each and a 220µF electrolytic capacitor [2800].

2.3.6 Analog interface to the AIO

The following analog signals are sent to the AIO's internal A/D converters:

TRIA_ALM	Tracking Information Audio (audio envelope information stereo only).
TRIV	Tracking Information Video (video envelope information).
TAE/TAS	Tape End / Tape Start Detection

2.3.7 Evaluation of the tape deck switches

There are two switches available:

INIT	Initialization switch
RECP	Record protection

2.3.8 CMT detection

The CSYNC signal coming from the VS part is integrated a comparator (IC7800-B). The integrated signal then reaches pin 33 (port 86), where the video signal is detected using the 50 Hz evaluation.

2.4 AUDIO (AF,AL,AP,AMP,IO,SF,ACO) - RUBAD, TVBAD, SFD

2.4.1 General:

a) Mono version:

The demodulators TDA 8842 (IC7205) and TDA 9830 (IC7705) are used for the audio demodulation for front end 1. The signal from front end 2 is demodulated using demodulator TDA 9817 (IC7309). The analog switches HEF 4052 (view selector: IC7651, mode selector: IC7658, Scart output selector: IC7904) are used as an audio I/O switch. As the record / playback amplifier, the linear audio part in the single chip YCA processor LA 71527 (IC7004) is used with the following functionality: An analog sound controller and pseudo stereo stage (IC7653) is used in the sound feature version. The audio output stage (IC7450) is equipped with a power limiting switch which prevents the speakers being overloaded.

b) Stereo version:

The multi-standard sound processor MSP 3410 / MSP3415 (IC7801) is a single chip solution containing three functional groups: FM/AM & NICAM demodulation (front end 1), I/O switch, I^2S interface (MSP 3410) and digital sound processing. This IC is controlled solely by the I^2C bus. The MSP 3415 (IC7670) is used for the FM / AM or NICAM demodulation from the front end 2. For the Dolby sound decoding, the DPL 3518 / 3519 (IC7800) is used, which also has the functionality of a matrix I/O switch. The FM audio processor TDA 9605 (IC7640) is used for FM audio modulation (recording mode), FM audio demodulation (playback mode), noise suppression, and as an I/O switch. This IC is controlled solely by the I^2C bus. The carrier frequencies and bandpass filter for the FM audio part are adjusted by the TDA 9605 independently. This adjustment is started via the I^2C bus following the mains reset. The HP2 signal is used as a reference for this. The linear audio part in the single chip YCA processor LA 71527 (IC7004) contains the functionality: Linear audio input switch and ALC (Automatic Level Control) stage, recording amplifier / recording equalizer, playback amplifier / playback equalizer and head change-over switch. The audio output stage (IC7450) is equipped with a power limiting switch to prevent the speakers being overloaded, and which limits the maximum output power per channel to 5 W_{RMS}.

2.4.2 Audio IN/OUT:

a) Mono version:

The entire audio I/O is switched using analog switches (HEF 4052) which are switched using state control lines. The view selector (IC7651) switches the signals from the front end, Scart / front cinch and tape (playback mode) to the audio output stage (speakers / headphones). The mode selector (IC7658) switches the signals from the view selector and radio tuners; and the IC7658 is used to switch the pseudo stereo effect (sound feature version). The Scart output selector (IC7904) switches the signal from the front end and tape (playback mode) to the Scart output. The input source switch in the single chip YCA processor LA 71527 (IC7004) is used as the recording input selector. For the Scart and front cinch inputs, buffer amplifiers (Scart:T 7906 / (7907), front cinch: T 7400 / (7401)) have been fitted. There is a driver stage (T7907) on the Scart output.

b) Stereo version:

The entire audio input and output selection is realized in the multi-standard sound processor MSP3410/ 3415 (IC7801) (multifunctional matrix I/O switch and digital I/O interface) and in the FM audio processor TDA9605 (IC7640) (input selection for Scart, front cinch, recording and record / playback switch. The Dolby Pro Logic decoder DPL 3518 / 3519 (IC7800) is connected using a digital I/O interface (I^2S bus) to the sound processor MSP3410. The I/O switches are controlled solely via the I^2C bus. The recording source selection for FM audio and linear audio, as well as the FM audio / linear audio change-over during playback (automatic detection), is detected and implemented automatically in the TDA 9605. In decoder mode, the bypass function of the FM audio processor is used to loop in the audio signals. For the Scart and front cinch inputs, buffer amplifiers (Scart: T 7906 / T 7907, front cinch: T 7400 / T 7401) are used to obtain the best possible signal quality. For the rear cinch outputs, driver amplifiers (IC7900 / IC7907) are used.

2.4.3 Sound processing & view mode:

a) Mono version:

The demodulation in FM / AM receive mode is carried out by demodulators TDA 8842 (IC7205) / TDA 9830 (IC7705). The audio signal is then forwarded to the view selector HEF 4052 (IC7651) (pin 1 / pin 12). In Scart or front cinch mode, the signal is first fed through the buffer amplifier and then reaches the view selector (pin 5 / pin 14). In tape playback mode, the signal from the linear audio processor (IC7004) is fed to the view selector (pin4 / pin 11). In the sound feature version, the signal first runs through the mode selector HEF 4052 (IC7658) pin 5 / pin 12, then the analog sound controller (Bass, Treble, pseudo stereo), which is realized using IC7653 (TL 074) and then back to the mode selector (only with the pseudo stereo version) IC7658 (pin 15), before it reaches the audio output stage (IC7450). In the version without sound features, the signal is fed via the view selector (pin 3) directly to the audio output stage. The sound feature part is controlled using control lines IBASS (bass emphasis), ITREBLE (treble emphasis), MUTE_PST (pseudo stereo). The volume is controlled using a D.C. regulated pre-amplifier stage in the audio output stage (control line VOL / pin 3). In the radio tuner mode, the audio signal runs from the tuner part via the signal amplifier T7657 to mode selector HEF 4052 (IC7658) pin 3 / pin 13, before it is fed to the audio output stage. The radio tuner mode is activated using control line RAD. The buzzer operation is controlled using the signal / control line RAB, whereby the buzzer signal is fed to the audio signal path via stage

R3674 / T7660. The Scart output selector HEF4052 (IC 7904) is provided to switch the audio signal from the front end and from the tape (playback mode) to the Scart output. The selected audio signal (pin 3) then runs through driver stage T7909, before it is output on the Scart output.

b) Stereo version:

The MSP3410 / 3415 (IC7801) contains a fully digital sound controller (DSP part) and the required A/D & D/A converter stages. The DSP part includes: Volume / Balance, Treble / Bass, Loudness and special sound effects controls. An AVL (Automatic Volume Levelizing) control is also included. All sound settings are controlled via the I^{2}C bus. In FM / AM or NICAM demodulation mode (View mode), the signal from the internal demodulator is connected directly to the DSP part. In Scart or front cinch mode the signals are first fed through the buffer amplifier and reach the input for the sound processor IC7801 (pin 52 / pin 53) via the FM audio processor (Scart: pin 6 / pin 7, front cinch: pin 2 / pin 3). In tape playback mode the signals are fed from the FM audio processor (IC7640) to the input for the multi-standard sound processor IC7801 (pin 49 / pin 50). The signals are then connected via the I/O matrix switch to the A/D converters. After conversion, the digital audio signals are conveyed to the DSP part, where they are processed digitally (pin 13). From the DSP part, the digital audio signal is forwarded to the I^{2}S output (pin 13) for processing in the Dolby decoder (IC7800). At the I^{2}S input (pin 14 / pin 20) on the sound processor (IC7801), the decoded digital audio signal from the Dolby decoder goes back to the DSP part for further processing (Dolby version). On the outputs on the DSP part, there are quad oversampling D/A converters for the speaker / headphone channels and the I/O matrix switch, where the digital audio signals are converted back into analog signals. (speakers / headphones: pin 29/ pin 28). The signals for the speaker / headphone output stage TDA 7495 (IC7450) are fed from the D/A converter output stages (LS). From the D/A converter output stages (HP), the signals reach the driver amplifier LM358 (IC7900) for the rear cinch output (pin 26 / pin 25). On the rear cinch output there is a mute stage fitted (T7901 / T7904) for the low-power stand-by mode, which is controlled using control line MUTE_PST. For the Scart output, the signals are fed to the I/O matrix switch output (pin 37 / pin 36).

2.4.4 Dolby decoding - APDOD

The DPL3518 / 3519 (IC7800) contains a fully digital Dolby Pro Logic decoder and a digital I/O interface (I^{2}S bus) with a multifunctional matrix switch. The coded audio signal is converted in the sound processor (IC7801) (A / D converter) and reaches the input (pin 12) of the Dolby decoder (IC7800) via the I^{2}S interface (output: pin 13) . Further processing is carried out purely digitally in the DSP part of the decoder. The signal on the output of the DSP part is forwarded to the I^{2}S output (pin 11 / pin 19) where it reaches the sound processor (IC7801) and is available for further processing (I^{2}S input : pin 14 / pin 20). From the output of the DSP part (DPL 3519), the decoded digital audio signal goes via a matrix switch to the D/A converter stages where the digital signal is converted back into an analog audio signal. From the converter output on the DPL3519 (pin 21 / pin 25) the signal is forwarded via the driver amplifier LM358 (IC7907) to the rear cinch output for the effect channels (center / surround). On the rear cinch output for the effect channels, there is a mute stage (T7908 / T7911) which is controlled using the control line MUTE_PST.

2.4.5 Linear audio recording & playback:

a) Recording:

The signal inputs for recording are pin 71 (Scart), pin 73 (front end) and pin 75 (front cinch) from the YCA processor LA 1527 (IC7004). For the HiFi version, the signal input for recording is pin 73 (AMLR). During recording or loop through (EE), the signal runs through the linear amplifier and then the mute stage and exits the IC on the signal output pin 77. The attenuator on pin 77 (R 3611, R 3616) sets the required level for the ALC (Automatic Level Control) detector, for which the time constant is determined on pin 72. The level for the recording amplifier is determined using R 3610 and R 3615. The pre-emphasis for the recording amplifier is created using the network L 5601, C 2622, C 2623 and R 3636. In longplay recording mode, the network C 2619 and R 3621 is switched in parallel to the internal switch on pin 3. The output for the recording amplifier is pin 1 (C 2617). The recording current is then added to the bias current via resistor R 3623 and flows via the head to pin 5, where the internal switch is closed. The oscillator switching (T 7607, L 5602), which oscillates at around 70 kHz, is used as the erasing oscillator for the main erasing head, the linear audio track erasing head, and for the bias current supply. The bias current is set using potentiometer R 3630. To prevent spikes, the oscillator is switched on slowly (switching stage T 7603, time constant C 2614, R 3613, R3619 and current limiter R 3614).

b) Playback:

During playback, the internal switch on pin 7 is closed. The playback signal from the linear audio head is amplifier during the equalizer stage and exits the IC at pin 10. The de-emphasis and the amplification is determined using network C 2620, C 2628, C 3624, R3624, R 3626, R 3631 and R 3634. In longplay playback mode, the frequency characteristic is adjusted using capacitor C 2616 located on pin 4 and using resistor R 3624 which is connected to pin 9. The resistor R 3632 and the capacitor C 2627 determine the head resonance during playback. The playback signal on pin 10 then runs through the filter C 2625 and R 3628. Located on pin 11 is the input for the linear amplifier, where the signal is amplified and exits the IC via the mute stage on pin 77. A special line frequency filter (L 5600, C 2604, C 2605, C 2606, C 2607 and R 3607) eliminates line frequency interference from the useful signal. The playback signal in the buffer amplifier T 7600 is then amplified and in the mono version, fed to the I/O selector switch (IC7904 / IC7651). With the HiFi stereo version, the signal is fed to pin 22 (AMLP) on the FM audio processor (IC7510), which is the input for linear audio. A potentiometer (0 .. 15 dB) controlled by the I^{2}C bus is used in the IC7640 to adjust the linear audio head and amplifier tolerances.

2.4.6 FM audio recording & playback:

a) Recording:

The audio signals from the recording front end 2 (pin 8 / pin 9), the SCART buffer amplifiers (pin 6 / pin 7) and the front cinch buffer amplifiers (pin 2 / pin 3) are conveyed to the two input selector switches on the FM audio processor TDA 9605 (IC7640), which select the corresponding signals for the FM audio and the linear audio part. The signal coming from the input selector switch (INPUT SEL) reaches, via a stereo level actuator (VOLUME L/R) controlled by the I^{2}C bus and a deep pass filter (fg > 30 kHz), the NOISE REDUCTION block which compresses the dynamics during recording. The compressed signal is then fed to both FM modulators (left channel: 1.4 MHz and right channel: 1.8 MHz carrier frequencies). Both carriers are added and fed to the FM audio head amplifier. Via the recording / playback switch on the head amplifier, which is switched using the control line RMA, the FM signal reaches the output (pin 35, pin 36, pin 37) on the FM audio processor and then the audio heads via the rotating transformer. The TRIA_ALM line forwards the size of both audio signals (1 V_{RMS} = 2.68 V_{DC}) to the AIO-µP (IC7900). This DC level information is required during recording by the SCART or front cinch socket to prevent overmodulation of the FM carriers. When the audio signal levels are too high, they are attenuated using the VOLUME controller via the I^{2}C bus.

b) Playback:

The FM signal from the audio heads goes via the rotating transformer to the recording / playback switch (pin 35, pin 36, pin 37) on the head amplifier. After amplification in the head amplifier (63 dB), the FM signal reaches the HF-AGC (Automatic Gain Control), where the tolerances of the tape, the heads and the rotating transformer are balanced. Via the two band pass filter and limiters, the FM signals reach the PLL demodulators. Head change-over interference is suppressed using SAMPLE & HOLD stages (triggered by the HP2 signal). The demodulated signals are then expanded into the NOISE REDUCTION stage. The hi-fi signals on the output selector switch are then available (hi-fi output pin 16 / pin 17). If there is no FM on the tape during playback, the output selector switch is switched over automatically from the IC to linear audio (input pin 22). In playback mode the TRIA_ALM line supplies the level of the FM envelope curve to the AIO-µP (IC7900).

This level information from the FM envelope curve is used for the hi-fi tracking of the rotating FM audio heads to achieve the best possible playback quality (normal: $3.5V_{DC}$).

2.4.7 HiFi audio interface to the linear audio:

In recording mode, the input selector switch NORMAL SEL in the FM audio processor (IC7640) selects the audio source and issues this signal to pin 21 (AMLR). The audio signal then reaches the audio part of the YCA processor LA71527 (IC7004) on pin 73. The input selector switch in the IC7004 is always set on the input IN 2 (pin 73). During playback, the AMLP signal from the linear audio part in the YCA processor (pin 77) is carried via pin 22 from the FM audio processor to the playback level attenuator which can be adjusted in service mode using the I^2C bus.

2.5 Receiver part (TU1,TU2) - TVBAD, RUBAD

The DELTA TVCR receiver part design permits component options to be used to create both a single or multi-standard mono 1 tuner front end with or without radio, and a multi-standard stereo 2 tuner front end. With the second tuner and the relevant front end circuit sections the VCR and TV parts can receive transmissions from the applied antenna signal independently from one another. With the stereo version, the sound processors of types MSP 3410D, 3415D and MSP 3415D-QG-A2 are used for the sound demodulation for the various TV standards.

2.5.1 Front end 1 (TV tuner)

The 1st tuner on the TVBAD pos. 1700/ 1701 is designed as a single or splitter tuner combination. With a two-tuner device, the splitter divides the incoming antenna signal into signals for the TV tuner and the VCR tuner connected using a short HF cable connection.

a) Single standard MONO intercarrier front end for the TV NORM BG, I, DK, K1:

The IF signal from tuner 1 pin 11 is offered for demodulation via OFW pos. 1707 to the front end part of the TV ICs TDA 8840/42 pos.7205 on pins 48 and 49. The IC TDA 8840 demodulates audio and video signals in the standards PAL B/G, PAL I. For the SECAM standard D/K and K1, the TDA 8842 type is used. The intercarrier signal on pin 6 is fed via a driver stage pos. 7702 to the filter pos. 1702 and, freed of video parts, to the TV-IC on pin 1 for audio demodulation. Via the AUDIOOUT pin 15, the NF audio signal is fed to the FE output **AFV1**. The video trap pos. 1704 frees the video signal from sound carrier remainders. Via emitter follower pos. 7704, the front end video signal reaches **VFV1** for further processing. The TV-IC has an AFC which does not require any adjustment. The HF AGC is adjusted using the service menu.

b) Dual standard MONO intercarrier front end for the BG/DK and BG/I TV standards:

The IF signal from tuner 1 pin 11 is subject to selection via HF switching diodes pos. 6700/6705 according to the relevant TV standard via OFW pos. 1707 (BG) or pos. 1708 (DK). The selection of the TV standard is controlled via line **PSS1**. With the BG/I version, only one OFW G1965M is used on pos.1707 for both TV standards. The TV-IC TDA 8842 (TDA8840 for BG/I) then demodulates the audio and video signal as described above. The sound carrier is selected using a switchover on pos.7701-A using control line **MNT1**. The BG sound carrier is filtered via pos.1702, and the DK or I sound carrier via pos. 1703. Via the AUDIOOUT pin 15, the NF audio signal is fed to the FE output **AFV1**. So that the video frequency response in the DK or I TV standards is not clipped too soon by a 5.5MHz trap, a video trap for 6.5MHz or 6.0MHz is selected using switch pos. 7701-B on pos. 1705. This is carried out on control line **TU1A_B**.

c) Multi-standard MONO FM intercarrier/AM QSS front end for the TV standards BG/I/L,L'

The IF signal from tuner 1 pin 11 is offered for demodulation via a 40.4MHz trap (coil 5701) and via OFW pos. 1708 to the front end part of the TV ICs TDA 8842 pos.7205 on pins 48 and 49. This demodulates the video signal of TV standards PAL BG,I and SECAM L,L' and the signal for the FM audio sound carriers 5.5MHz and 6.0MHz required for PAL via the switchable filters 1702 and 1703. The switchover is carried out using control line **MNT1**.
The AM audio required for the SECAM L,L' TV standard is obtained from the IC TDA 9830 pos. 7705. To do this, the IF coming from tuner 1 is connected via HF switching diodes pos. 6706/6707 using control line **SB1_1** on the relevant input on the OFW pos. 1711 for selection (pin 1 SEC L' 40.4MHz/pin 2 SEC L 32.4MHz). The demodulated AM audio signal exits the IC 7705 pin 6 and is fed via coupling capacitor 2716 to the external input on the TV-IC pin 2. From the TV IC the audio signal conforming to the TV standard is switched through to pin 15 (AUDIOOUT) and to front end output AFV1. The TV standard switchover between positive and negative modulation (PSS) is carried out via the I^2C bus on the TV IC. The double trap pos. 1704 frees the video signal of PAL BG, I- sound carrier remainders. So that the video frequency response in the SECAM L,L' TV standards is not clipped too soon, the video trap bypass is selected using switch pos. 7701-B. This is carried out on control line **TU1A_B**.

d) Multi-standard STEREO hybrid front end for the TV standards BG/I/DK/L,L'

The IF signal from tuner 1 pin 11 is offered for demodulation via a 40.4MHz trap (coil 5701) and via OFW K3953M pos. 1708 to the front end part of the TV ICs TDA 8842 pos.7205 on pins 48 and 49. This demodulates the video signal for the PAL I and SECAM L,L' TV standards with a flat group delay time. The HF-AGC is controlled by the TV IC. It is adjusted in the service menu.
The video signal for PAL BG and PAL/SECAM DK, and the AM audio signal for SECAM L,L' and the intercarrier signal for all FM and NICAM sound carriers are generated in the QSS process by IC TDA 9818 pos. 7720. Via OFW G3956M pos. 1709 the IF video signal is selected using a group delay time pre-equalization typical for PAL and offered to the video demodulator on pins 1 and 2.
The IF required for the audio demodulation is connected via HF switching diodes pos. 6701/6702 using control line **SB1_1** to the relevant input on the OFW pos. 1710 for selection.
Via pin 1 on the OFW K9456M the IF for SECAM L' reaches the audio demodulator with 40.4MHz. pin 2 selects the FM, AM and NICAM sound IF for the TV standards BG, I DK, L from 32.4 to 33.4MHz. By selecting this OFW, only sound carriers without interference from video sections are allowed through.
The audio IF output signal from the TDA 9818 is an audio IF signal gained during the QSS process. FM sound carriers are converted from the picture IF level into the audio IF position. The audio IF signal is then demodulated in the MSP 3410/15D pos.7801 on the APDOD sub-printed board and processed further. In the case of SECAM L/L, the TDA 9818 also demodulates the AM carriers. The demodulated audio signal pin 8 gained in this way is available on the **AFV1** and is connected from the IO part of the MSP 1 together with the other internal and external sources if necessary.
From pin 16 via R3727, the video signal reaches video trap pos. 1704. Once there, the video signal is freed of sound carrier remainders and fed to the switch pos. 7701-B. Using control line **TU1A_B**, the video signal from the TDA 8842 (SECAM L, L', PAL I) or the signal from the TDA 9818 (PAL BG, DK) is selected and reaches the front end video signal output VFV1 via emitter follower pos. 7704.
Control line **PSS1** switches the demodulator IC between negative and positive (SECAM L, L') modulation. The AFC reference circuit pos. 5707 is adjusted from 38.9MHz to 2.5V on pin 17 for an IF frequency.

Multi-standard sound demodulator MSP 3410/15D

The MSP 3410D (pos.7801) is a multi-standard sound processor which can demodulate FM Mono/Stereo, NICAM and AM signals. To do this, several audio input and output signals can be switched. The MSP 3410D can therefore be used to realize a stereo audio I/O. The MSP 3410D can select from 2 audio IF signals. However, only one input is used in this device. The incoming signal is first controlled and then digitized. The digital signal is then demodulated in 2 separate channels. In the first MSP channel, FM and NICAM (B/G or I) are demodulated, whereas in the second MSP channel, FM and AM is demodulated again (NICAM L corresponds to NICAM B/G). These demodulated signals are selected digitally in the I/O and switched to the D/A converter on the outputs. Amplitude and bandwidth of the demodulated audio signals can be determined in the MSP using the corresponding commands via the I^2C bus. This means that the setting required for the best possible performance can be made. In DELTA stereo only

the German stereo/mono and NICAM audio signals for the standards B/G, I and D/K are demodulated by the MSP.
The only difference between the MSP 3410D and the MSP 3415D is that the MSP 3415D has fewer I/O options than the MSP 3410D.

2.5.2 Front end 2 (VCR tuner)

From the splitter in tuner 1 comes the antenna signal to tuner 2 on the RUBAD pos.1301. The IF signal from tuner 2 is processed by another demodulator IC of type TDA9817T/18T pos.7309. The demodulator is used to demodulate pos. or neg. modulated picture carriers and to gain a QSS sound IF signal for the demodulation in the MSP 3415D-QG-A2 MSP2 pos.7670.

a) Single standard MONO intercarrier front end for the TV NORM BG, I, DK, K1:

The IF signal from tuner 2 pin 11 is offered for demodulation via OFW pos. 1302 to the demodulator IC TDA 9817T pos.7309 on pins 1 and 2. The IC is offset into the intercarrier mode by an earthing jumper on pin 24. The sound carrier in intercarrier signal on pin 12 is fed via a filter pos. 1306 selected according to the TV standard to the FM demodulation input pin 13. The NF audio signal is then available on pin 8 and thus on front end output **AFV2** for further processing. A video trap pos. 1304 frees the video signal of sound carrier remainders. Via emitter follower pos. 7305, the front end video signal reaches **VFV1_2** for further processing.
HF-AGC: The IF amplitude on tuner output pin 11 on 550 mV_{pp} is set using controller 3307. Input condition 74 dBµV HF signal without sound carrier.
AFC: The reference circuit pos. 5300 is adjusted for an IF frequency from 38.9MHz to 2.5V on pin 17.

b) Dual standard MONO QSS front end for the BG/DK and BG/I negatively modulated TV standards:

The IF signal from tuner 2 pin 11 is offered for the BG/DK version via OFW pos. 1302 to the demodulator IC TDA 9817T pos.7309 on pins 1 and 2. For BG/I the IF is fed via HF switching diodes pos. 6300/6301 using control line **RCLK_MNT2** to the relevant OFW modified for the TV standard. The OFW G3956M pos. 1302 has a group delay time pre-equalization required for PAL, whereas the OFW K3953M pos. 1300 is modified for the I TV standard. The IF required for the audio demodulation is conveyed via HF switching diodes pos. 6303/ 6304 to the OFW pos. 1305. Via pin 1 on the OFW K9463M the audio IF for DK and I reaches the audio demodulator with 32.4MHz – 32.9MHz. Pin 2 selects the audio IF for the BG TV standards, from 33.4MHz. By selecting this OFW, only sound carriers without interference from video sections are allowed through. The sound carrier is selected by a switchover on pos. 7301-A. Via control line **RCLK_MNT2**, the sound carriers for BG are selected via filter pos. 1306 or DK or I via pos. 1307. The NF audio signal is available on pin 8 and thus on front end output **AFV2** for further processing. A video trap pos. 1304 frees the BG video signal of sound carrier remainders. For the I TV standard the trap bypass is switched via pos. 7301-B using control line **RCLK_MNT2**. The front end video signal **VFV1_2** goes for further processing via emitter follower pos. 7305.

c) Multi-standard MONO FM/AM QSS front end for the TV standards BG/I/L,L'

The video signal from tuner 2 pin 11 is offered via a 40.4MHz trap (coil 5301) on the OFW pos. 1300 to the demodulator IC TDA 9818T pos.7309 on pins 1 and 2. The IF required for the audio demodulation is connected via HF switching diodes pos. 6303/ 6304 using control line **RWE_SB1_2** to the relevant input on the OFW pos. 1305 for selection. Via pin 1 on the OFW K9456M the IF for SECAM L' reaches the audio demodulator with 40.4MHz. Pin 2 selects the FM and AM sound IF for the TV standards BG, I, L from 32.4 to 33.4MHz. The sound carrier is selected by a switchover on pos. 7301-A. Via control line **RCLK_MNT2** the sound carrier for BG is selected via filter pos. 1306 or I via pos. 1307. The FM or AM NF audio signal is available on pin 8 and is therefore also available on the front end output AFV2 for further processing. Using control line **RDATA_PSS2** the demodulator is switched to SECAM L,L' mode. A video trap pos. 1304 frees the BG video signal of sound carrier remainders. For the PAL I and SECAM L,L' TV standards, the trap bypass is switched via pos. 7301-B using control line **RCLK_MNT2**. Via emitter follower pos. 7305, the front end video signal reaches **VFV1_2** for further processing. The setting of the picture carrier frequency for SECAM L in the TDA 9818 is achieved by connecting pin 7 of the IC via 5K6 to earth using transistor 7300 by control line **RWE_SB1_2**. As in SECAM band 1, the AFC is not used for fine adjustment, a more precise setting is not necessary.

d) Multi-standard STEREO FM/AM QSS front end for the TV standards BG/I/D/K/L,L':

The video IF signal from tuner 2 pin 11 is fed via a 40.4MHz trap (coil 5301) and HF switching diodes 6300/6301 using control line **RCLK_MNT2** to the OFW modified for the relevant TV standard. The OFW G3956M pos. 1302 has a group delay time pre-equalization required for the BG and DK TV standards, whereas the OFW K3953M pos. 1300 is modified for PAL I and SECAM L,L'. The IF required for the audio demodulation is fed via HF switching diodes pos. 6303/6304 to the OFW pos. 1305. Via pin 1 on the OFW K9456M the IF for SECAM L' reaches the audio demodulator with 40.4MHz. Pin 2 selects the FM, AM and NICAM sound IF for the TV standards BG, I DK, L from 32.4 to 33.4MHz. By selecting this OFW, only sound carriers without interference from video sections are allowed through.
The audio IF output signal from the TDA 9818T is an audio IF signal gained during the QSS process. FM sound carriers are converted from the picture IF level into the audio IF position. The audio IF signal is then demodulated in the MSP 3415D-QG-A2 pos.7670 and processed further. In the case of SECAM L/L, the TDA 9818 also demodulates the AM carriers. The demodulated audio signal pin 8 gained in this way is available on the **AFV1** and is connected from the IO part of the MSP 1 together with the other internal and external sources if necessary.

MSP 3415D-QG-A2
For a functional description, see MSP 3410D front end 1

2.6 Video IN/OUT (IO_1,TV,VS,HPAV) - RUBAD, TVBAD

2.6.1 Block diagrams

Video branch 1tuner

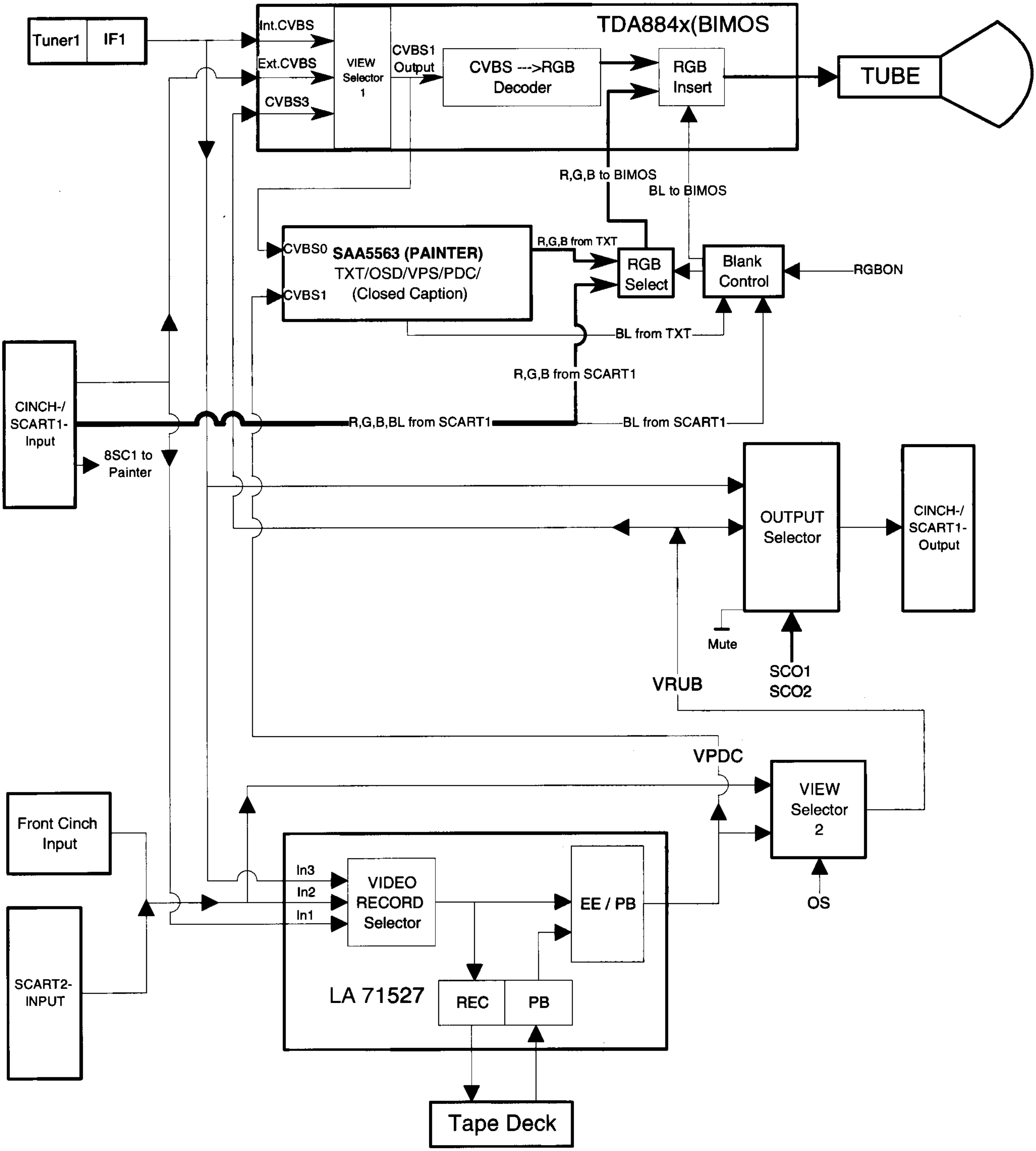

Tuner1
IF1
Int.CVBS
Ext.CVBS
CVBS3
VIEW Selector 1
CVBS1 Output
CVBS --->RGB Decoder
RGB Insert
TDA884x(BIMOS
TUBE
R,G,B to BIMOS
BL to BIMOS
CVBS0
CVBS1
SAA5563 (PAINTER)
TXT/OSD/VPS/PDC/
(Closed Caption)
R,G,B from TXT
RGB Select
Blank Control
RGBON
BL from TXT
R,G,B from SCART1
CINCH-/ SCART1-Input
R,G,B,BL from SCART1
BL from SCART1
8SC1 to Painter
OUTPUT Selector
CINCH-/ SCART1-Output
Mute
SCO1
SCO2
VRUB
VPDC
VIEW Selector 2
OS
Front Cinch Input
SCART2-INPUT
In3
In2
In1
VIDEO RECORD Selector
EE / PB
LA 71527
REC
PB
Tape Deck

Figure 2

Video branch 2tuner

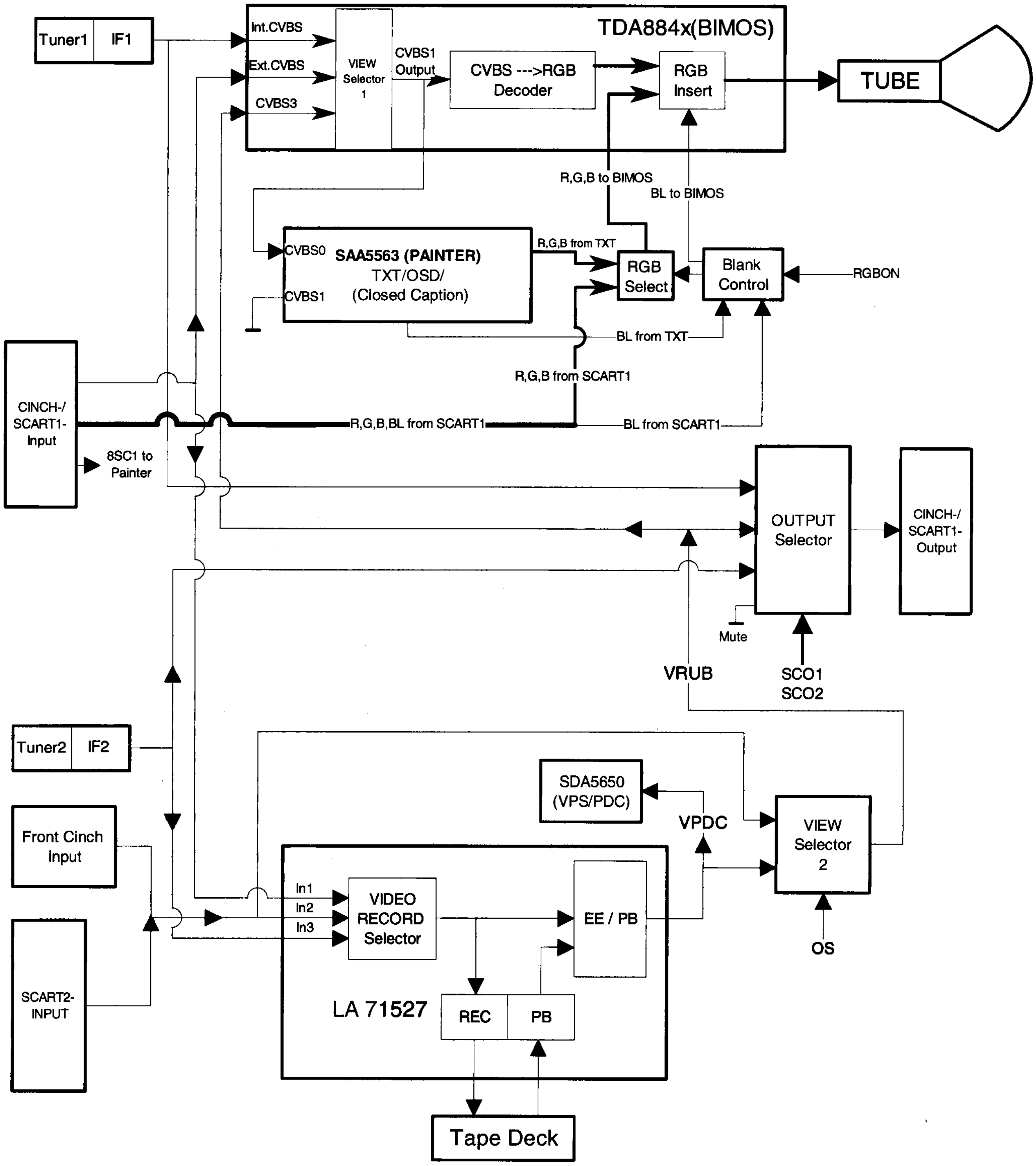

Tuner1
IF1
Int.CVBS
Ext.CVBS
CVBS3
VIEW Selector 1
CVBS1 Output
TDA884x(BIMOS)
CVBS --->RGB Decoder
RGB Insert
TUBE
R,G,B to BIMOS
BL to BIMOS
CVBS0
SAA5563 (PAINTER)
TXT/OSD/
(Closed Caption)
CVBS1
R,G,B from TXT
RGB Select
Blank Control
RGBON
BL from TXT
R,G,B from SCART1
CINCH-/ SCART1- Input
R,G,B,BL from SCART1
BL from SCART1
8SC1 to Painter
OUTPUT Selector
CINCH-/ SCART1- Output
Mute
VRUB
SCO1
SCO2
Tuner2
IF2
SDA5650 (VPS/PDC)
VPDC
VIEW Selector 2
Front Cinch Input
In1
In2
In3
VIDEO RECORD Selector
EE / PB
LA 71527
REC
PB
OS
SCART2- INPUT
Tape Deck

Figure 3

The entire video-in/out processing can be divided into three selectors:

a) View selector:

This selector is primarily located in the TV processing / IC7205 (view selector 1) where either tuner1 (VFV1 / pin13), Scart1 (VSCIN/pin17) or the signal from the RUBAD board (VRUB/pin11) is selected. The selected signal in the TV-IC is forwarded to the picture tube and is available on pin38 where it is fed via emitter follower 7201 (VTV) to the Painter/ IC7804 for data decoding.
The second section of this selector is located on the RUBAD board (view selector 2). The IC7503 (HEF4053) selects either the signal from the front socket or Scart2 (VFC/plug 1907 pin1) or the output for the signal processing (IC7004 pin38) and is switched from the AIO via the OS control line. The selected signal reaches the TVBAD board via emitter follower 7505 and plug 1963 / pin9. For devices with just 1 tuner the VPDC signal (corresponding to IC7004 / pin38 via emitter follower 7501) is required for decoding the VPS/ PDC data from the Painter/IC7804.
The VFC signal is either that from the 2nd Scart socket or the front cinch input. The switchover is carried out using a mechanical switch directly in the front socket on the HPAV board (front in has priority over Scart2). For devices without a front cinch (and therefore also without Scart2) this selector is not required (IC7503 on the RUBAD printed board) and the VPDC signal is used for the further processing.

b) Record selector:

This entire selector is located in the video signal processing/ IC7004 and is controlled using the bus lines SCL2/SDA2 from the AIO. The selection is carried out from the signals from Scart1 (VSCIN/ pin28), front cinch/Scart2 (VFC/ pin30) and the front end (VFV1_2/ pin32).
The selected signal is available on pin34 IC7004 and is used on pin35 IC7004 for the internal processing or as the VREC signal for the Secam signal processing. Depending on the device type, the VFV1_2 signal either represents the front end video for the receiver on the TVBAD board for 1-tuner devices or the signal from the RUBAD board for devices with 2 tuners.

c) Output selector:

This selector is located on the TVBAD board and is used to select which signal is available on the Scart1. The switch is part of a HEF4052/ IC7904 (second part used for audio for mono devices) and is controlled using SCO1/SCO2 from the Painter/ IC7804 (used as a port expander for the AIO). The selection made from video signals VFV1 (tuner1)/IC7904 pin12, VFV1_2 (tuner2, if present)/ IC7904 pin14 and the VRUB or VPDC signal from the RUBAD board)/ IC7904 pin15. For certain device statuses, a mute feature can be realized by selecting IC7904 pin11. The selected signal (IC7904 pin13) is amplified using 7902/7903 by a factor of 2 (equals 6dB) and output on pin19/ Scart1 via 3906/3909 (75Ω source impedance).
For devices with two tuners, there must not be any DC step changes during the switchover. For this reason, both signals (VFV1 and VFV1_2) are connected to the switch via clamp transistors 7901/ 7908 and emitter follower 7900/ 7905. Diodes 6907/ 6908 and 6913 are used to improve the crosstalk characteristics.

2.7 Video signal processing (VS,VSEC) - RUBAD

2.7.1 Switchover functions on the signal electronics IC LA71527:

The signal electronics IC LA71527 [7004] is controlled via the I^2C bus (SCL2, SDA2) on pins 63 and 64 on the microprocessor (IC 7900).

REC/PB
via the I^2C bus [during RECORD pin 19 **(REC HIGH OUT)** goes to 5V (not used)]

PAL/SECAM/MESECAM/NTSC
via the I^2C bus (during NTSC playback pin 43 goes to 5V)

SP/LP/SLP
via the I^2C bus

VIDEO INPUT SELECTOR SWITCH
Using the I^2C bus, the video on pins 28 (SCART), 30 (front cinch) or 32 (tuner 1 or 2) can be selected and connected.

VIDEO ENTRY
On pin 33 (FFP), the artificial picture pulse is keyed for playback features and the test picture for the device installation:

Loop through	<	0.8V
Artificial picture pulse	>	3.8V

COLOUR VECTOR
The colour vector is adjusted using pin 67 (CSCP):

Normal	<	0.8V
LP features, colour	=	⎍

2.7.2 Recording:

a) Luminance

The video input signal (pin 28 = SCART, pin 30 = front cinch or Scart2, pin 32 = front end 1 or 2) is connected in the IC7004 and is available on pin 34 as VREC with $1V_{pp}$. Via an electrolytic capacitor it reaches pin 35. In the IC7004 the video signal first goes through an amplification control process (time constants determined by C 2041). After the AGC, the signal reaches a terminal stage, is attenuated by 6 dB and goes via a 3.5 MHz deep pass filter (chroma suppression) to the vertical emphasis (out: pin 42, in: pin 40). This emphasis comprises a 1H-CCD delay line in the IC7002 (in: pin 5, out: pin 7) and an emitter follower 7003. The signal then travels via another emitter follower 7005 from pin 25 to pin 26. The filter based on the emitter follower does not function in REC mode due to the low resistance of the emitter follower. The Y signal then travels through the detail enhancer, the non-linear emphasis, the linear emphasis (time constant via pin 23,24) and the white/dark clipping stage. The signal generated in this way then triggers the FM modulator directly. Before the FM signal exits the IC at pin 18, it travels through a deep pass filter. It is then fed as an FMRV via an external emitter follower 7013 and R3105 to be added to the chroma signal.

b) Chrominance PAL

The chroma signal is separated from the incoming video signal (pin 35) by a band pass filter (BPF1) and reaches an ACC stage. The ACC amplifier stage controls the chroma amplitude for the subsequent stages (time constant via capacitor on pin 13). The chroma signal is then conveyed to the main converter. The main converter mixes the 5.06MHz subcarrier on the auxiliary converter with the 4.43 MHz chroma signal to the 627kHz chroma FM signal. The subcarrier is a mixture of 4.43MHz (the REC APC time constant on pin 54 compares quartz and burst frequency) and (40+ 1/8) f_H = 627kHz (produced by 321f_H -VCO, time constant pin 49/51 and phase rotation in accordance with the VHS standard, control pin 66). Via a band pass filter and the colour killer stage, the converted chroma signal reaches pin 14 on the IC, from where it is added directly to the Y FM signal via resistors 3102 and 3103. The colour killer can either identify the incoming signal on its own (PAL yes/no, PAL: chroma signal out, SECAM L: chroma signal killed) or be set to PAL or SECAM L using the I^2C bus. The quartz oscillation (pin 56) is used both as the reference frequency and for the chroma processing, as well as for generating the pulse frequency for the combined CCD [7002, pin 10].

c) MESECAM

The signal path is virtually identical to the path for PAL.
The differences are:

- No phase rotation.
- Broader filter characteristics for the chroma bandpasses.
- Free-running quartz frequency.

d) SECAM L

The FBAS signal (VREC) from the IC7004 runs via C2072 to pin 15/IC 7072 (SECAM L chroma signal processor LA 7339), completes a 4.3MHz-BP within the IC, and then to the bell filter (HF cloche) which reverses the sender-side HF pre-emphasis. In addition, the IC generates the 1.1 MHz signal required for recording using frequency separation (1:4) of the chroma signal. The signal is then blanked during the line synchronous pulse period and reaches the 1.1MHz-BP which suppresses the harmonics produced in the frequency separation process. The next anticloche filter produces the FM pre-emphasis again, which is provided as standard for a Secam chroma signal. This signal then exits the IC on pin11 and runs via a 3.3MHz trap C2080 / L5073 and emitter follower 7073 as CSRV for addition to the luminance FM signal. The Secam recording current is set using controller 3086.

2.7.3 Playback:

a) Luminance

The FM playback signal goes from the head amplifier IC 7104/05 to the signal electronics IC7007, pin 15 as an FMPV. In the IC7004, the level of the envelope curve is first controlled and then filtered in the FM processing. On pin 17, the signal exits the IC, runs through a phase shifter and a transistor stage to adjust the filter characteristics and re-enters the IC7004 on pin 20. The FM signal limited using the double limiter is demodulated and filtered using a deep pass.

The demodulated Y signal is also affected by the recording-side pre-emphasis. This then deals with the linear de-emphasis on the basis of the emitter follower 7005. The filter connection is effective because in playback mode, pin 25 becomes the open collector output. The load impedance for this output is determined by the de-emphasis circuit. Using a peaking stage (pin 22) the frequencies are raised by approx. 2.5 MHz. The Y signal is then terminated, filtered using a low pass, and carried by a vertical noise canceller or dropout compensator. For this purpose, the Y signal leaves the IC7004 (out: pin 42, in: pin 40) and is delayed by 1H in the IC7002. The CCD-1H delay line is effective for the Y signal first as a comb filter (vertical noise suppression) and secondly as a line storage device for the dropout compensation. The subsequent switching stages are: The non-linear de-emphasis, horizontal noise canceller and the picture control switching to the increase in edge steepness (sharpness). The chroma signal is then added to the luminance signal and output as a FBAS signal (pin 38).

b) Chroma PAL

On pin 15, the FMPV signal is carried from the head amplifier to the IC7004 signal electronics. From the FMPV signal the 627-kHz chroma signal is filtered using the internal deep pass. The ACC amplifier amplifies and controls the chroma amplitude. In the main converter, the chroma signal is mixed with 5.06 MHz back to the original 4.43 MHz. The 5.06 MHz are produced in playback from the free-running quartz oscillator and from the (40+1/8) f_H = 627 kHz frequency derived from the 321f_H-VCO. After the main converter, the chroma signal is mostly freed of crosstalk from additional traces using 2H comb filter 7002. The chroma signal is then filtered using band pass, checked by the colour killer, looped through pin 46 and 45 and then added to the Y signal.

c) Chroma MESECAM

The signal path is virtually identical to the path for PAL.
The differences are:

- The 321 f_H VCO is synchronized by the Sync.
- No phase rotation.
- The comb filter is not active.
- Greater bandwidth for the internal bandpass filter.

d) Chroma SECAM L

During playback, the FM signal is fed from the head amplifier (FMPV) to pin 13 IC7072, controlled and sent via the same 1.1MHz bandpass as for recording. The NF pre-emphasis for recording is then reversed. The anti-cloche switching in recording is used here as cloche switching. In the next stage, the frequency of the signal is doubled. The 2.2MHz band pass frees the signal from interfering harmonic waves, before it is doubled in frequency once more. So that the signal becomes a standard Secam chroma signal, it is provided with an HF pre-emphasis again (anti-cloche). Finally, the chroma signal runs through a mute stage and reaches the 2.2MHz trap C2076/L5071 via pin 17 and emitter follower 7071, before it reaches pin 45 of the signal electronics IC 7004 as a CSP signal via a coupling capacitor. The 3.3MHz interference level needs to be kept to a minimum using controller 3089.

e) NTSC

During the playback of NTSC signals, the original NTSC chroma is converted into a PAL chroma signal (see above for control signals). This requires an IC-internal switchover in the chroma part, but also a switchover in the CCD-IC7002 to a 1H comb filter to the crosstalk reduction. Line and picture frequencies remain unchanged in accordance with the NTSC standard.

f) PAL M,N

As for chroma PAL.

2.8 Video head amplifier (HA) - RUBAD

Head amplifier IC STV5744 for 4-head pos.7105 (STV5742 for 2-head pos.7104)

2.8.1 Recording

The changeover to recording is carried out using the FMPV line via pin 15, which functions as a switching input (with IREV via [7102]). The video recording current, which is summated from luminance and PAL/SECAM chrominance, is supplied to pin 19 (15). The recording current is then fed to pin 1(SP) or pin 11(LP) to the video heads. The current through 3110 on pin 18 (14) TRIV acts as a current reference for setting the recording current. 7106 switches (controlled by the SP recording output) with SP a resistance parallel to 3110 and therefore allows the required increase in recording current for SP. The record AGC is only specified during CSYNC=H (pin 17(13)).

2.8.2 Playback

The FM signals from the video heads are conveyed during playback via pins 5 and 7 with SP or the pins 4 and 8 with LP to the low-noise playback amplifiers. The video heads are switched using the summated HP1 and HSC signal on pin 13 (9). The CSYNC signal on pin 17 (13) ensures that the switchover between the SP and LP heads in feature mode is carried out at the next rising edge of the pulse and therefore only at the end of a line. The playback signal reaches the signal electronics (VS) as FMPV via pin 15 (11). During playback, pin 18 (14) supplies the TRIV signal which represents a DC proportional to the signal intensity. TRIV is used for the deck controller as information for auto tracking. The unused head pair is short-circuited to the amplifier inputs via pin 19 (15) (functions as a switching input during playback) to reduce crosstalk in the ring transformer in the scanners (controlled using ISWS via 7100). The ENVC signal output to pin 12 supplies to the deck µC the information as to whether or not the PB signal for the SP or the LP heads is greater.

2.9 TV signal processing (TV) - TVBAD

The center of this switching part is the IC7205, the I^2C bus-controlled PAL/NTSC/SECAM TV processor TDA8840/42/44.
The most important integrated modules for video processing are:

- CVBS switchover
- Luminance delay line
- Chroma bandpass filter with switchable center frequency
- PAL / NTSC / SECAM decoder

Differences between the individual IC versions:

IC version	TDA 8840	TDA 8841	TDA 8842	TDA 8844
PAL decoder	X	X	X	X
SECAM decoder			X	X
NTSC decoder		X	X	X

2.9.1 Video signal processing

In the IC7205, the IF signal (IF-IN pins 48,49) is demodulated, runs through a video amp mute stage and exits the IC at pin 6. From there, the signal is conveyed further, as described in chapter 2.5.1 (front end 1). The "internal" front end video VFV1 then reaches pin 13/IC7205 (CVBS_INT). Other video sources for the internal switchover include the video from SCART VSCIN to pin 17 (CVBS_EXT) and the video from recorder unit board VRUB to pin 11 (CVBS_Y). The source selection is made in the IC using the CVBS switch controlled by the I^2C bus. Pin 38 (CVBS1OUT, $2V_{PP}$) supplies the VTV video signal via emitter follower 7201 to supply IC7804 (Teletext decoder) with the Teletext information.

CVBS switch and video identification:

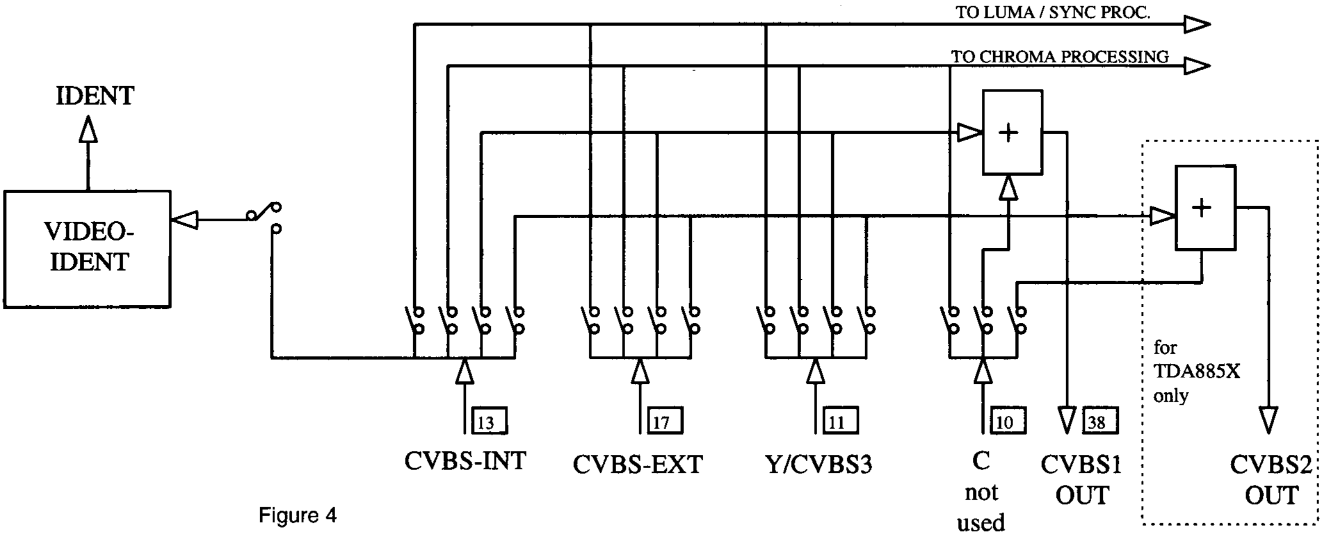


Figure 4

2.9.2 Chroma signal processing

The filters used internally in the TV-IC are active filters which are calibrated automatically. The medium frequencies of the chroma band pass filter can be switched using the I^2C bus to optimize it for the various input signals. The colour decoder can decode PAL, NTSC and SECAM signals (depending on the IC type), has a colour killer stage, and two demodulators for the colour difference signals. The demodulated colour difference signals are conveyed internally to the base band delay line to improve the cross colour performance (comb filter effect).

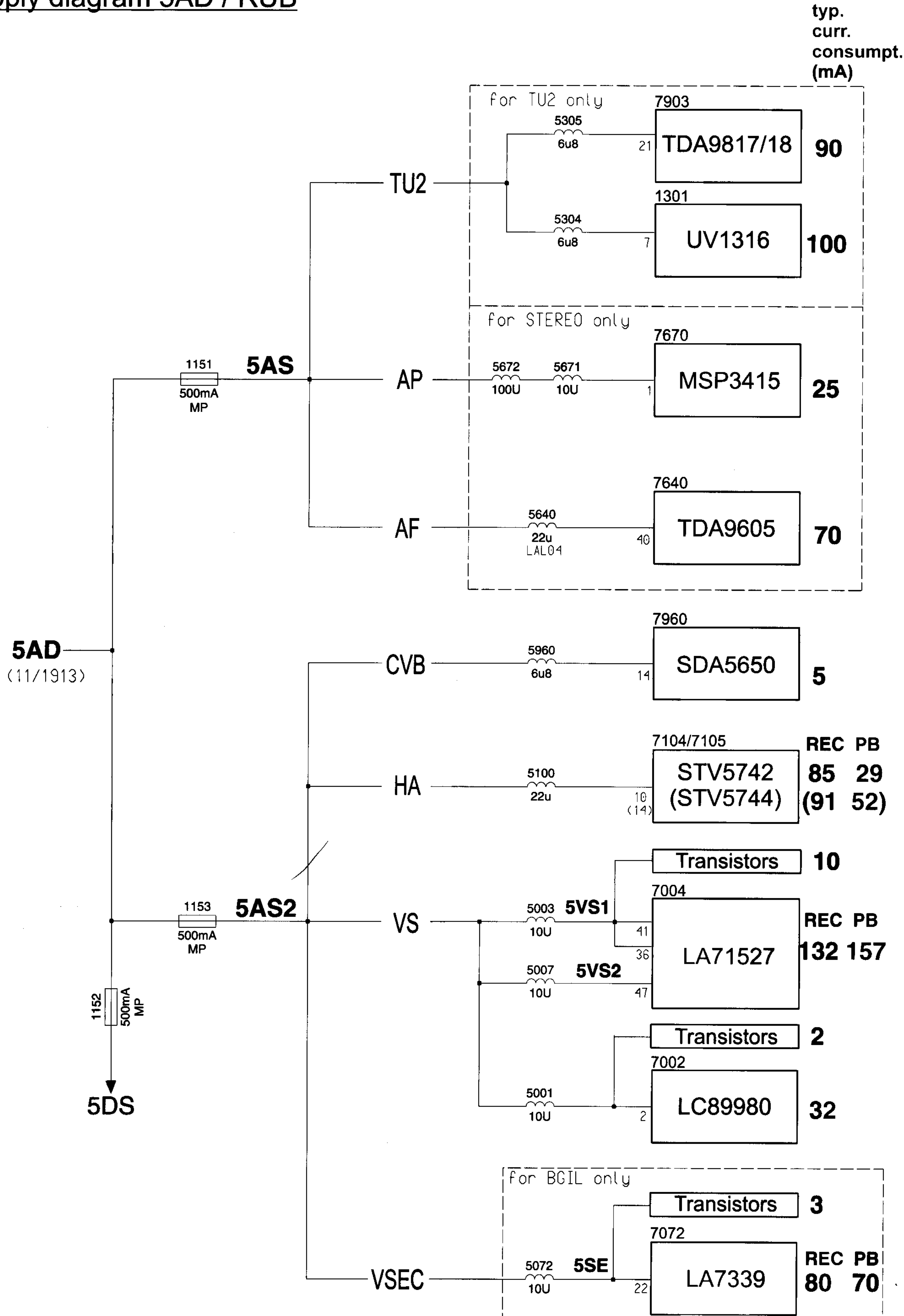
2.9.3 RGB signal processing

The RGB signals are formed via matrix switches from the luminance signal and the colour difference signals. The TV-IC also has an RGB input stage (pin 23, 24, 25). These signals can be keyed using the fast blanking signal (pin 26). Using switch HC4053 (IC7212), either the Teletext signals RTXT, GTXT, BTXT or the RGB signals from the SCART socket RED, GREEN, BLUE are selected, controlled by the blanking pulses BLTXT or BLSC. The RGB output signals (pins 19, 20, 21) are fed directly to the picture tube printed board via plug pos.1957.

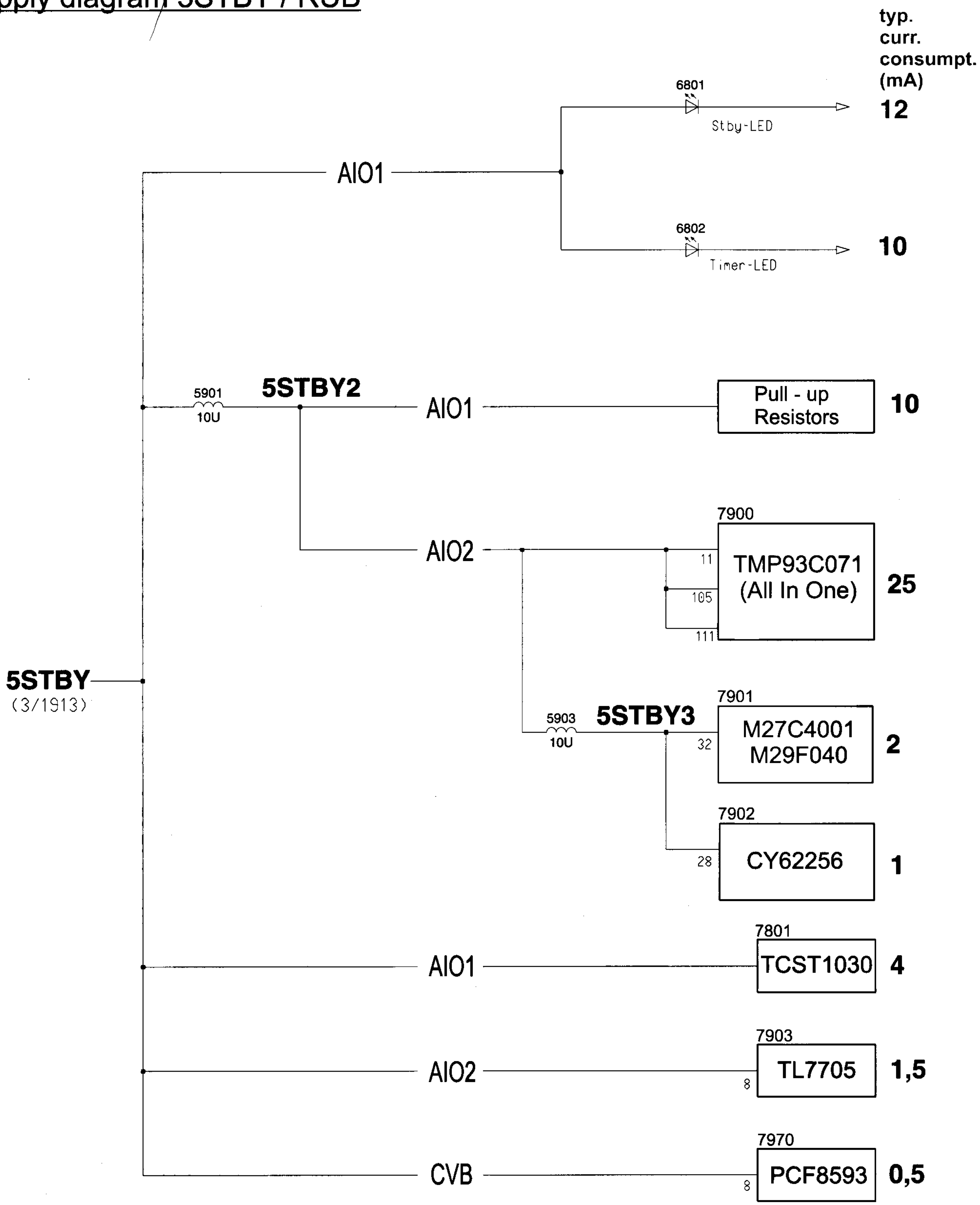
2.9.4 TV synchronization

In the TV-IC, the separated sync pulses are carried to the first phase detector ("φ-1 loop") and the coincidence detector. The coincidence detector is used to detect whether or not the line oscillator is synchronized. The "φ-1 loop" is used to synchronize the horizontal oscillator with the separated sync pulses of the selected video. The "φ-2 loop" corrects oscillations in the actual horizontal deflection depending on the beam current relative to the horizontal oscillator. For the timing of the vertical ramp, the vertical divider is used, which is synchronized to the vertical sync pulse.

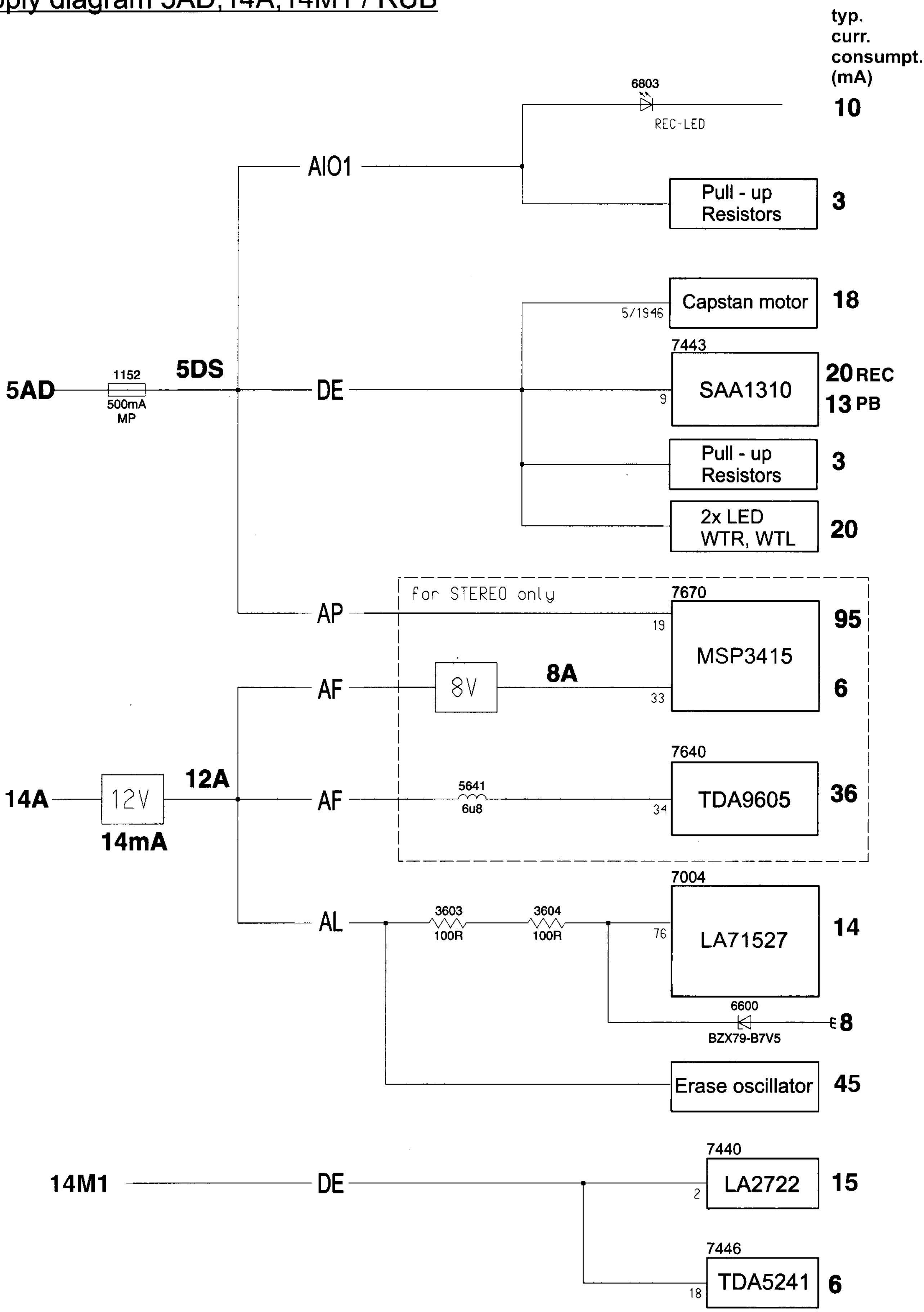
Supply diagram 5AD / RUB


typ.
curr.
consumpt.
(mA)
for TU2 only
7903
5305
6u8
21
TDA9817/18
90
TU2
1301
5304
6u8
7
UV1316
100
for STEREO only
7670
1151
500mA
MP
5AS
AP
5672
100U
5671
10U
1
MSP3415
25
7640
AF
5640
22u
LAL04
40
TDA9605
70
7960
5AD
(11/1913)
CVB
5960
6u8
14
SDA5650
5
7104/7105
REC PB
HA
5100
22u
10
(14)
STV5742
(STV5744)
85 29
(91 52)
Transistors
10
7004
1153
500mA
MP
5AS2
VS
5003
10U
5VS1
41
36
LA71527
REC PB
132 157
5007
10U
5VS2
47
1152
500mA
MP
Transistors
2
7002
5001
10U
2
LC89980
32
5DS
for BGIL only
Transistors
3
7072
REC PB
VSEC
5072
10U
5SE
22
LA7339
80 70

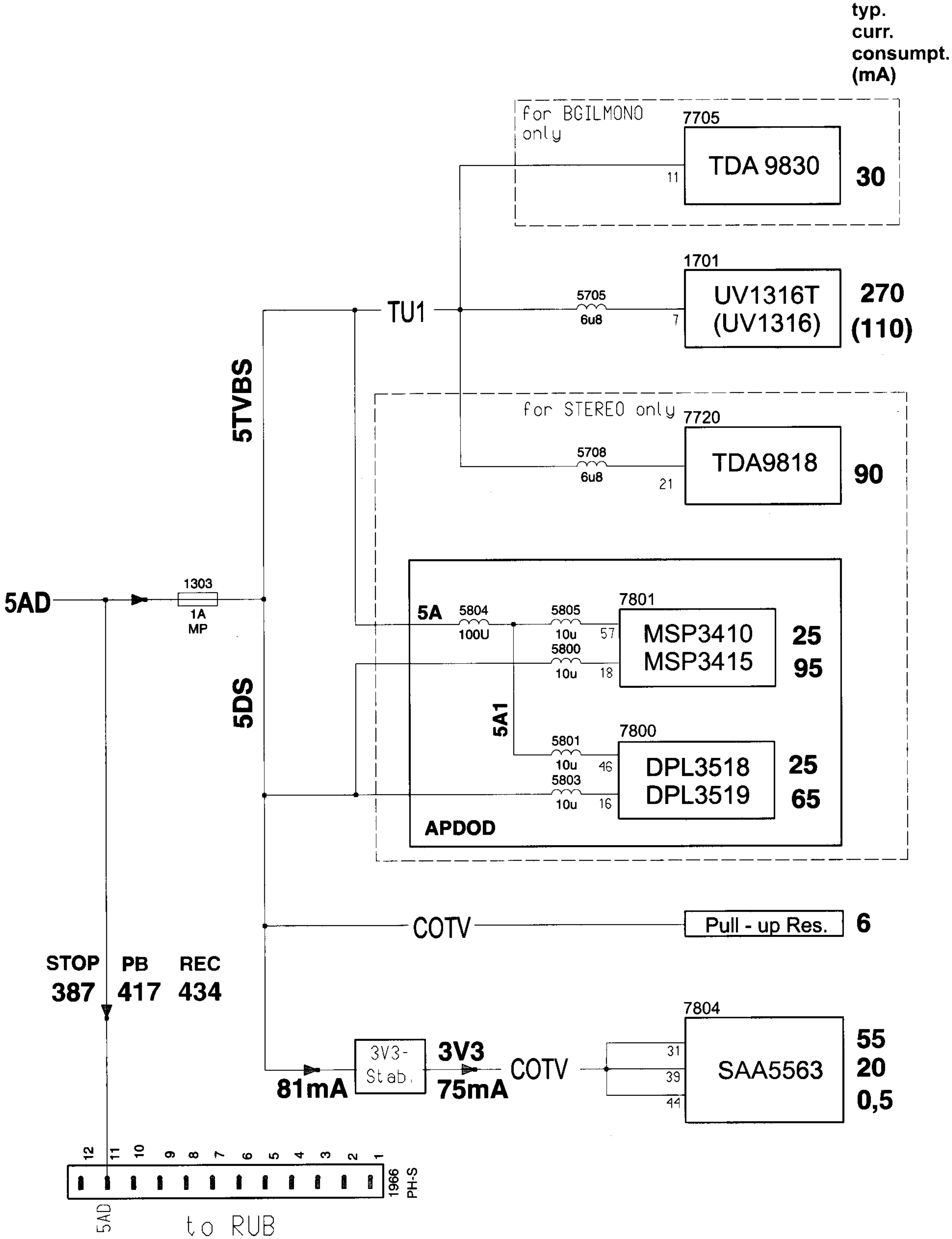
Supply diagram 5STBY / RUB


typ.
curr.
consumpt.
(mA)
6801
Stby-LED
12
AIO1
6802
Timer-LED
10
5901
10U
5STBY2
AIO1
Pull - up
Resistors
10
7900
AIO2
11
105
111
TMP93C071
(All In One)
25
5STBY
(3/1913)
7901
5903
10U
5STBY3
32
M27C4001
M29F040
2
7902
28
CY62256
1
7801
AIO1
TCST1030
4
7903
AIO2
8
TL7705
1,5
7970
CVB
8
PCF8593
0,5

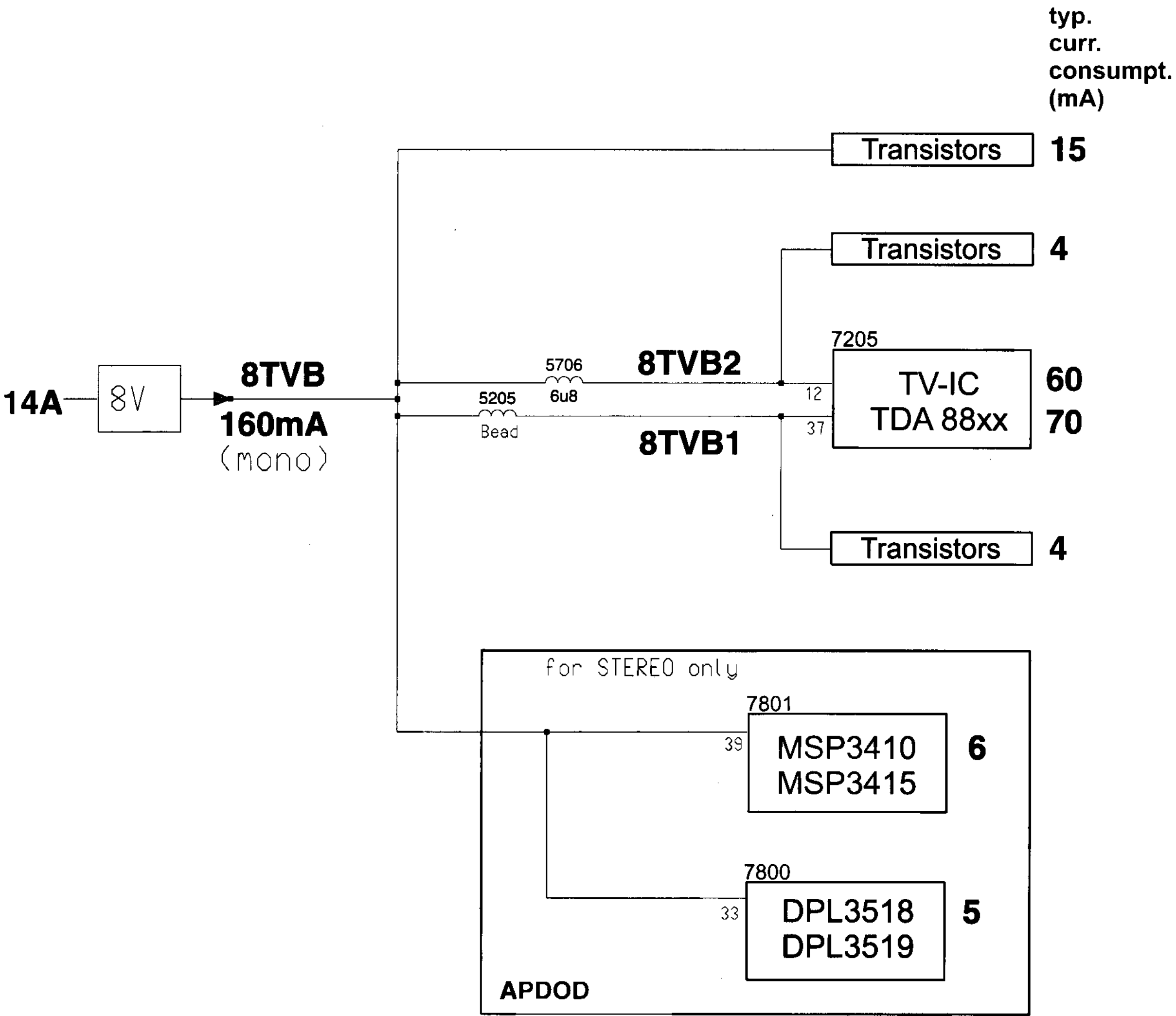
Supply diagram 5AD,14A,14M1 / RUB


typ. curr. consumpt. (mA)
5AD
1152
500mA MP
5DS
AIO1
6803
REC-LED
10
Pull - up Resistors
3
DE
5/1946
Capstan motor
18
7443
9
SAA1310
20 REC
13 PB
Pull - up Resistors
3
2x LED WTR, WTL
20
for STEREO only
AP
7670
19
MSP3415
95
AF
8V
8A
33
6
14A
12V
14mA
12A
AF
5641
6u8
7640
34
TDA9605
36
AL
3603
100R
3604
100R
7004
76
LA71527
14
6600
BZX79-B7V5
8
Erase oscillator
45
14M1
DE
7440
2
LA2722
15
7446
18
TDA5241
6

Supply diagram 5AD / TVB


typ.
curr.
consumpt.
(mA)
for BGILMONO only
7705
TDA 9830
11
30
1701
UV1316T
(UV1316)
270
(110)
5705
6u8
7
TU1
5TVBS
for STEREO only
7720
TDA9818
5708
6u8
21
90
5AD
1303
1A
MP
5DS
5A
5804
100U
5805
10u
57
5800
10u
18
7801
MSP3410
MSP3415
25
95
5A1
5801
10u
46
5803
10u
16
7800
DPL3518
DPL3519
25
65
APDOD
COTV
Pull - up Res.
6
STOP
387
PB
417
REC
434
7804
SAA5563
31
39
44
55
20
0,5
3V3-
Stab.
3V3
81mA
75mA
COTV
12
11
10
9
8
7
6
5
4
3
2
1
1966
PH-S
5AD
to RUB

Supply diagram 14A / TVB


typ. curr. consumpt. (mA)
14A
8V
8TVB
160mA
(mono)
5706
6u8
5205
Bead
8TVB2
8TVB1
Transistors
15
Transistors
4
7205
12
37
TV-IC
TDA 88xx
60
70
Transistors
4
for STEREO only
7801
39
MSP3410
MSP3415
6
7800
33
DPL3518
DPL3519
5
APDOD

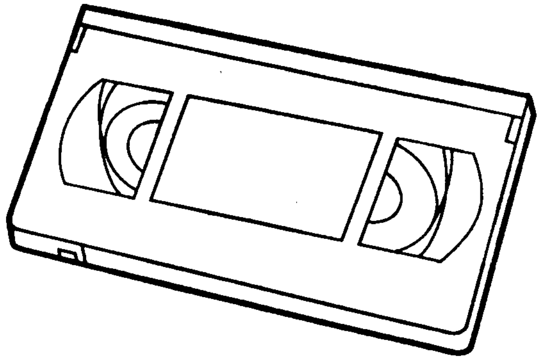
E. ELECTRICAL SETTINGS

1. MEASURING INSTRUMENTS

The following instruments are required to carry out the electrical setting work:

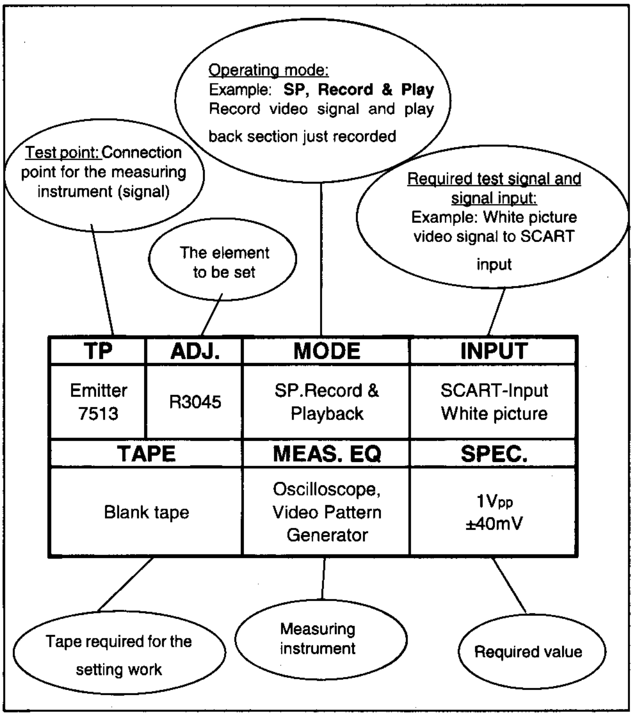
1. Dual trace oscilloscope
   Voltage range : 0.001 ~ 50V/Div.
   Frequency range : DC ~ 50 MHz
   Probe : 10:1; 1:1
2. Digital Multimeter
3. Frequency meter
4. Sine-wave generator : 0 ~ 50MHz
5. Test pattern generator
6. Plastic adjustment tool
7. Isolating transformer (regulating transformer)
8. VHS test cassette 4822 397 30103
   SPC test cassette 4822 397 30268

VHS test cassette



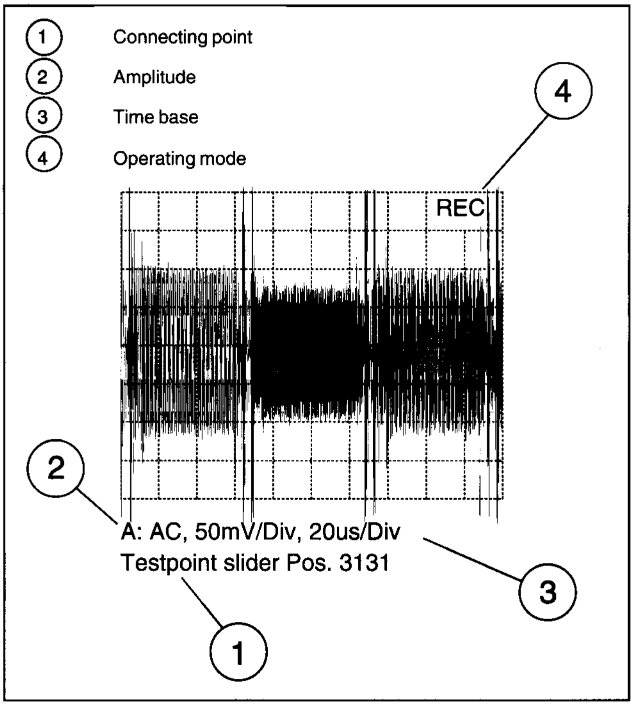
Counter Reading Start	0	0040 ±8	0310 ±12
Video	Blank	B&W Pattern	Color Bars
Audio	Blank	6kHz (mono)	40Hz, 3kHz, 15kHz (Mono & Stereo)

2. SETTING INSTRUCTIONS


Test point: Connection point for the measuring instrument (signal)
Operating mode: Example: SP, Record & Play Record video signal and play back section just recorded
The element to be set
Required test signal and signal input: Example: White picture video signal to SCART input
Tape required for the setting work
Measuring instrument
Required value

TP	ADJ.	MODE	INPUT
Emitter 7513	R3045	SP.Record & Playback	SCART-Input White picture

TAPE	MEAS. EQ	SPEC.
Blank tape	Oscilloscope, Video Pattern Generator	1V_{pp} ±40mV



① Connecting point
② Amplitude
③ Time base
④ Operating mode

A: AC, 50mV/Div, 20us/Div
Testpoint slider Pos. 3131

3. SETTINGS

The following settings are described below:

1. Power supply unit
2. Clock setting
3. Tuner 1
4. Tuner 2
5. Servo-system
6. Luminance and chrominance
7. Audio part
8. TV and picture tube part

3.1 Power supply unit (PS)

3.1.1 UBAT [R3348]

Purpose: Ensure correct functioning

Consequences of incorrect settings:
The correct functioning of the TV and VCR is not guaranteed.

TP	ADJ.	MODE	INPUT
C2353	R3348	Mains switch ON	SCART-Input No signal
TAPE		**MEAS. EQ**	**SPEC.**
		Digital Voltmeter	14",20",21" = 95V 25" = 138V (see description below)

Note: C2353 and R3348 are located on the TVB-board (PS part)

PROCEDURE:

- Set potentiometer R3348 to the centre position.
- Switch the device to the SCART input; do not apply a signal.
- Set the brightness and contrast to minimum.
- Connect the multimeter to C2353.
- Set a voltage of 95V (for 14",20" and 21") or 138V (for 25") using the potentiometer R3348.
- After making the setting, reset the original brightness and contrast values.

3.2 Clock setting

Purpose: Precise setting of the clock

Consequences of incorrect settings:
The clock gains or loses time.

TP	ADJ.	MODE	INPUT
IC7970 Pin 7	Service Menu	Service Mode	No Input signal
TAPE		**MEAS. EQ**	**SPEC.**
		Frequ. Counter	See description below

Note: IC7970 is located on the RUB-board (CVB part)

PROCEDURE:

- Call up Service mode (press the "STOP" button on the remote control, then the "PLAY" button on the device, and hold down both buttons for approx. 5 seconds).
- Connect the frequency meter to IC 7970 pin 7 and measure the 1Hz signal to at least 6 decimal places
- In the Service menu, select the "SERVICE CONTROL" line using the " ▼ " button and press " ▶ ".
- Select the "CLOCK ADJUSTMENT MENU " line using the " ▼ " button
- Use the number keys to enter the value measured and hold down the "OK" button for 5 seconds until "STORED" appears.

Note: The input can be cancelled by pressing the "MENU" button (Service menu is switched off). Pressing "MENU" again switches the Service menu back on

3.3 Tuner 1 (TV)

3.3.1 Automatic frequency control AFC1 [5707] (only for Stereo)

Purpose: Correct functioning of the demodulator switching.

Consequences of incorrect settings:
Poor or distorted reception in TV circuits

Preparation:
Connect pin 1 on tuner 1700/1701 to pin 10.

TP	ADJ.	MODE	INPUT
IC7720 Pin 17	L5707	TV	38,9MHz / 200mV_{pp} on Pin 11 Tuner 1700/1701
TAPE		**MEAS. EQ**	**SPEC.**
		Digital Voltmeter, Frequ. Generator	2,5V ±0,2V

Note: IC7720 and L5707 are located on the TVB-board (TU1 part).

3.3.2 Automatic gain control AGC 1

Purpose: Set the automatic gain control

Consequences of incorrect settings:
If the input level is too low, the AGC synchronisation will not function correctly in the TV circuits. If the level is too high, the picture may be distorted.

TP	ADJ.	MODE	INPUT
Tuner 1700/1701 Pin 11	Service Menu	Service Mode	5mV (74dBμV) on aerial input channel 24 PAL-White picture no audio carrier
TAPE		**MEAS. EQ**	**SPEC.**
		Oscilloscope (10:1 Probe), Video Pattern Generator	550mV_{pp} -1dB (See description below)

PROCEDURE:

- Call up Service mode (press the "STOP" button on the remote control, then the "PLAY" button on the device, and hold down both buttons for approx. 5 seconds).
- In the Service menu, use the " ▼ " button to select the "SERVICE CONTROL MENU" line and press " ▶ "
- Select the "TUNER 1 AGC" line using the " ▼ " button
- Use the " ◀ " and " ▶ " arrow buttons to set the level on the tuner output to 550 mV_{pp} and hold down the "OK" button for approx. 5 seconds until "STORED" appears

Note: Tuner 1700/1701 is located on the TVB-board (TU1 part).

3.3.3 40.4 MHz suppression in tuner 1 [5701] (for SECAM only)

Purpose: Suppress residual band I carriers.

Consequences of incorrect settings:
Poor or distorted reception in TV circuits due to a weakening of the PAL picture carrier (38.9 MHz).

TP	ADJ.	MODE	INPUT
SAW 1708 Pin 1	L5701	TV	40,4MHz / 200mV$_{pp}$ on Pin 11 Tuner 1700/1701
TAPE		**MEAS. EQ**	**SPEC.**
		Oscilloscope (10:1 Probe), Frequ. Generator	Adjust to minimum amplitude

Note: SAW1708 and L5701 are located on the TVB-board (TU1 part).

3.3.4 Tuner 1 Type

Purpose: Set the tuner type used

Consequences of incorrect settings:
No reception in UHF range.

TP	ADJ.	MODE	INPUT
	Service Menu	Service Mode	5mV (74dBµV) on aerial input channel 40 (623MHz)
TAPE		**MEAS. EQ**	**SPEC.**
		Video Pattern Generator	See description below

PROCEDURE:
- In Manual Tuning Mode set channel 40 and save it under a program number.
- Call up Service Mode (press the "STOP" button on the remote control, then the "PLAY" button on the unit, and hold down both buttons for approx. 5 seconds).
- In the Service Menu, select the "SERVICE CONTROL MENU" line using the " ▼ " button and press " ▶ "
- Select the line "TUNER 1 TYPE" using the " ▼ " button.
- Use the arrow buttons " ◀ " and " ▶ " to switch between "PH" and "AL" and the position at which the test picture is displayed, save using the "OK" button (hold down for 5 secs.).

3.4 Tuner 2 (TU2)

3.4.1 Automatic frequency control AFC2 [5300]

Purpose: Correct functioning of the demodulator switching.

Consequences of incorrect settings:
Poor or distorted reception in VCR circuits

Preparation:
Connect pin 1 of tuner 1301 to pin 10.

TP	ADJ.	MODE	INPUT
IC7309 Pin 17	L5300	TV	38,9MHz / 200mV$_{pp}$ on Pin 11 Tuner 1301
TAPE		**MEAS. EQ**	**SPEC.**
		Digital Voltmeter, Frequ. Generator	2,5V ±0,2V

Note: IC7309 and L5300 are located on the RUB-board (TU2 part).

3.4.2 AFC 2 reference

Purpose: Adjust the synchronous operation of tuner 1 and tuner 2.

Consequences of incorrect settings:
Poor or distorted reception in TV or circuits.

Preparation:
Connect pin 1 of tuner 1301 to pin 10.

TP	ADJ.	MODE	INPUT
	Service Menu	Service Mode, PAL-Mode	38,9MHz / 200mV$_{pp}$ on Pin 11 Tuner 1301
TAPE		**MEAS. EQ**	**SPEC.**
		Frequ. Generator	See description below

PROCEDURE
- Call up Service mode (press the “STOP” button on the remote control, then the “PLAY” button on the device, and hold down both buttons for approx. 5 seconds).
- In the Service menu, use the “ ▼ ” button to select the “SERVICE CONTROL MENU” line and press “ ▶ ”.
- Use the “ ▼ ” button to select the “TUNER 2 AFC REF.” line and press “ ▶ ”.

3.4.3 Automatic gain control AGC 2 [3307]

Purpose: Set the automatic gain control

Consequences of incorrect settings:
If the input level is too low, the AGC synchronisation will not function correctly in the VCR circuits. If the level is too high, the picture may be distorted.

TP	ADJ.	MODE	INPUT
Tuner 1301 Pin 11	R3307	TV	5mV (74dBµV) on aerial input channel 24 PAL-White picture no audio carrier
TAPE		**MEAS. EQ**	**SPEC.**
		Oscilloscope (10:1 Probe), Video Pattern Generator	550mV$_{pp}$ -1dB

Note: Tuner 1301 and R3307 are located on the RUB-board (TU2 part).

3.4.4 40.4 MHz suppression in tuner 2 [5301] (for SECAM only)

Purpose: Suppress residual band I carriers.

Consequences of incorrect settings:
Poor or distorted reception in VCR circuits due to a weakening of the PAL picture carrier (38.9 MHz)

TP	ADJ.	MODE	INPUT
SAW 1300 Pin 1	L5301	TV mode tuned to SECAM Bd I channel	40,4MHz / 200mV$_{pp}$ on Pin 11 Tuner 1301
TAPE		**MEAS. EQ**	**SPEC.**
		Oscilloscope (10:1 Probe), Frequ. Generator	Adjust to minimum amplitude

Note: SAW1300 and L5301 are located on the RUB-board (TU2 part).

3.4.5 Tuner 2 Type

Purpose: Set the tuner type used

Consequences of incorrect settings:
No reception in UHF range.

TP	ADJ.	MODE	INPUT
	Service Menu	Service Mode	5mV (74dBµV) on aerial input channel 40 (623MHz)
TAPE		**MEAS. EQ**	**SPEC.**
		Video Pattern Generator	See description below

PROCEDURE:

- In Manual Tuning Mode set channel 40 and save it under a program number.
- Call up Service Mode (press the "STOP" button on the remote control, then the "PLAY" button on the unit, and hold down both buttons for approx. 5 seconds).
- In the Service Menu, select the "SERVICE CONTROL MENU" line using the " ▼ " button and press " ▶ "
- Select the line "TUNER 2 TYPE" using the " ▼ " button.
- Use the arrow buttons " ◀ " and " ▶ " to switch between "PH" and "AL" and the position at which the test picture is displayed, save using the "OK" button (hold down for 5 secs.).

3.5 SERVO-SYSTEM (DE)

3.5.1 Gap position

Purpose: Ensure correct head changeover during playback.

Consequences of incorrect settings:
Poor head changeover, changeover visible in picture, or picture fluctuations.

TP	ADJ.	MODE	INPUT
	Service Menu	Service Mode, Playback	
TAPE		**MEAS. EQ**	**SPEC.**
VHS Alignment Tape 4822 397 30103			See description below

PROCEDURE

- Call up Service mode (press the "STOP" button on the remote control, then the "PLAY" button on the device, and hold down both buttons for approx. 5 seconds).
- In the Service menu, use the " ▼ " button to select the "SERVICE CONTROL MENU" line and press " ▶ ".
- Use the " ▼ " button to select the "GAP POSITION" line. Play back the VHS test cassette (4822 397 30103) and press " ▶ "

The setting is made automatically and the corresponding values are stored in the EEPROM.
The device switches to STOP after the setting has been made.
If the setting has not been completed correctly, the device ejects the cassette.

Possible causes:
Poor video signal.
Head disc is defective.
µP defective.

3.6 Luminance and chrominance (VS,VSEC)

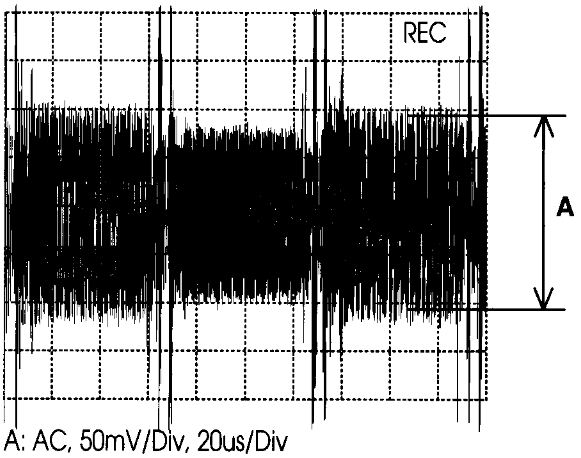
3.6.1 SECAM recording current [R3086]

Purpose: Ensure optimal chrominance level during recording.

Consequences of incorrect settings:
If the chroma level is too high during recording, cross patterns may appear in coloured areas.
If the level is too low, colour noise interference may occur.

TP	ADJ.	MODE	INPUT
C2077/ R3100	R3086	Record	SECAM-Red picture (75% Saturation) on SCART
TAPE		**MEAS. EQ**	**SPEC.**
Blank Tape		Oscilloscope, Video Pattern Generator	**A**=100mV$_{pp}$ ±10mV (see Fig. E4)

Notes: With varying frame amplitudes, the setting is made for the greatest amplitude.R3086 is located on the RUB-board (VSEC part).



A: AC, 50mV/Div, 20us/Div
Testpoint slider Pos. 3131

Fig. E4

3.6.2 3.3MHz adjustment [R3089] (only for SECAM)

Purpose: To adjust the mixing oscillator

Consequences of incorrect settings:
Cross patterns in coloured areas, coloured noise.

TP	ADJ.	MODE	INPUT
	R3089	SP. Record & Playback	SECAM-Red picture (75% Saturation) on SCART
TAPE		**MEAS. EQ**	**SPEC.**
Blank Tape		Video Pattern Generator	See description below

PROCEDURE:
- Play back red image recorded.
- Use R3089 to set the interference to a minimum level.

Note: R3089 is located on the RUB board (VSEC part).

3.6.3 Studio picture control SPC

Purpose: Set the reference level for the SPC.

Consequences of incorrect settings:
Resolution too low or "strays" during playback.

TP	ADJ.	MODE	INPUT
	Service Menu	Service Mode, Stop	PAL-Black picture on SCART
TAPE		**MEAS. EQ**	**SPEC.**
SPC-Alignment Tape 4822 397 30268		Video Pattern Generator	See description below

PROCEDURE
- Call up Service mode (press the "STOP" button on the remote control, then the "PLAY" button on the device, and hold down both buttons for approx. 5 seconds).
- In the Service menu, use the "▼" button to select the "SERVICE CONTROL MENU" line and press "▶".
- Use the "▼" button to select the "SPC ADJUSTMENT" line.
- Play back the VHS test cassette (4822 397 30268) and press "▶"

The setting is made automatically and the corresponding values are stored in the EEPROM.
The device switches to STOP after the setting has been made.
If the setting has not been completed correctly, the device ejects the cassette.

Possible causes:
Poor video signal.
Head disc is defective.
µP defective.

3.7 Audio part

3.7.1 Erase frequency

Purpose: Set optimal erase frequency.

Consequences of incorrect settings:
Erase frequency or harmonic waves may cause interference.

TP	ADJ.	MODE	INPUT
Connector 1961 Pin1	L5602	Record	PAL-White picture with audio on SCART
TAPE		**MEAS. EQ**	**SPEC.**
Blank Tape		Frequ. Counter Video Pattern Generator	70kHz ±10kHz

Note: Connector 1961 and L5602 are located on the RUB-board (AL part).

3.7.2 BIAS magnetic biasing current [R3630]

Purpose: Set optimal magnetic biasing current.

Consequences of incorrect settings:
If the level is too high, the treble response in the linear tone is too low. If the level is too low, the treble response is too great, and the harmonic distortion is increased.

TP	ADJ.	MODE	INPUT
R3629	R3630	Record	PAL-White picture with audio on SCART
TAPE		**MEAS. EQ**	**SPEC.**
Blank Tape		AC-Millivoltmeter, Video Pattern Generator	$16mV_{RMS}$ ±1mV (see description below)

Note: R3629 and R3630 are located on the RUB-board (AL part).

Checking the magnetic biasing current setting:
Apply a sine-wave signal with an amplitude of 50mVeff to the SCART audio input. Record the 1kHz signal and 10kHz signal for 30 seconds each. Play back the recording and check that the amplitude difference is in the ±3dB range. If this is not the case, correct the value for the magnetic biasing current. If the treble is too low, the bias current should be reduced slightly. If the distortion is too great, the bias current should be increased slightly.
(approximate value: +1mV = -1dB Treble).

3.7.3 Audio playback level

Purpose: Ensure a uniform level for recording and playback.

Consequences of incorrect settings:
Level fluctuations during playback.

STEREO sets

TP	ADJ.	MODE	INPUT
Pin 1 SCART (AudOutR)	Service Menu	SP. Record & Playback	PAL-White picture 500mVRMS/1kHz on Pin 2 and 4 SCART
TAPE		**MEAS. EQ**	**SPEC.**
Blank Tape		AC-Millivoltmeter, Video Pattern Generator	500mVRMS ±50mV (see description below)

PROCEDURE:

- Play back the 1kHz sine-wave signal recorded.
- Call up Service mode (press the "STOP" button on the remote control, then the "PLAY" button on the device, and hold down both buttons for approx. 5 seconds).
- In the Service menu, use the "▼" button to select the "SERVICE CONTROL MENU" line and press "▶".
- Use the "▼" button to select the "AUDIO LIN. PLAYBACK" line.
- Switch over to mono using the "AUDIO" button.
- Use the arrow buttons "◀" and "▶" to set the audio level on the SCART output to 500mVRMS and hold down the "OK" button for 5 seconds until "STORED" appears.

Note: The input can be cancelled by pressing the "MENU" button (Service menu is switched off). Pressing "MENU" again switches the Service menu back on.

MONO sets

TP	ADJ.	MODE	INPUT
Pin 1 SCART (AudOutR)	R3638	SP. Record & Playback	PAL-White picture 500mVRMS/1kHz on Pin 2 and 4 SCART
TAPE		**MEAS. EQ**	**SPEC.**
Blank Tape		AC-Millivoltmeter, Video Pattern Generator	500mVRMS ±50mV

Note: R3638 is located on the RUB-board (AL part).

3.8 TV and picture tube settings (TV, LS)

Preparation:

- Demagnetise the picture tube (connect the device – cooled to room temperature – to the mains).
- Allow the device to warm up for around 15 minutes.
- Set up the screen to face eastwards
- ABS Loop ON (Service menu)
  Switch "CONTRAST PLUS" in the "PICTURE" menu to "OFF".

3.8.1 Cut-off

Purpose: Set the operating point setting for ABS Loop

Consequences of incorrect settings:
Incorrect colour temperature with a dark picture. White peak missing.

TP	ADJ.	MODE	INPUT
Conn. 1955 Pins 6,8,11 Conn. 1958 Pins 3,7,9	SCREEN on Line transf.	TV	PAL-Black picture with Burst on SCART
TAPE		**MEAS. EQ**	**SPEC.**
		Digital Voltmeter, Video Pattern Generator	14" = 140V 20,21,25" = 150V (see description below)

PROCEDURE:

- Call up Service mode (press the "STOP" button on the remote control, then the "PLAY" button on the device, and hold down both buttons for approx. 5 seconds).
- In the Service menu, use the "▼" button to select the "SERVICE CONTROL MENU" line and press "▶".
- Use the "▼" button to select the "TV DEFAULT VALUES" line and press "OK".
- Increase the brightness so that the black picture becomes slightly brighter.
- On the picture tube connector 1958 on the R,G,B pins 8,6 and 11 (for 20",21" and 25") or 1955 pins 3,7 and 9 (for 14") (see square contact surfaces) as certain the cathode connection to which the greatest voltage is being applied.
- Set the cathode (with the highest voltage) to 140V (for 14") or 150V (for 20,21,25") using the SCREEN controller on the line transformer.
  Remark: SCREEN is the lower controller on the transformer.

3.8.2 Focus

Purpose: Ensure optimal picture sharpness.

Consequences of incorrect settings:
Blurred picture

TP	ADJ.	MODE	INPUT
	FOCUS on Line Transf.	TV	Crosshatch pattern on SCART
TAPE		**MEAS. EQ**	**SPEC.**
		Video Pattern Generator	Best picture sharpness

Note: Before adjustment, set the sharpness in the "PICTURE" menu to the centre value. Remark: FOCUS is the upper controller on the transformer.

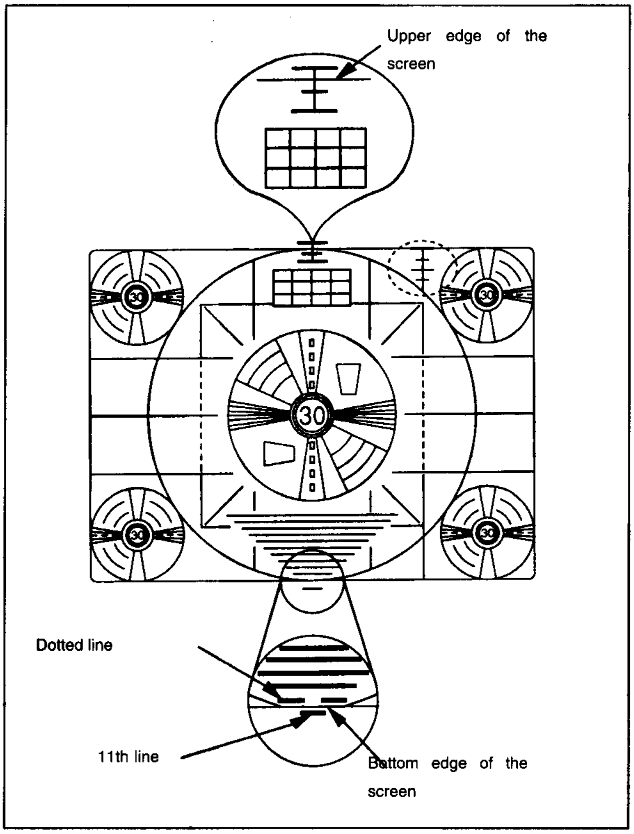


Fig. E5

3.8.3 Horizontal picture position

Purpose: Ensure correct horizontal picture position

Consequences of incorrect settings:
Missing picture information on the edge of the screen

TP	ADJ.	MODE	INPUT
	Service Menu	Service Mode, Playback	
TAPE		**MEAS. EQ**	**SPEC.**
VHS-Alignment Tape 4822 397 30103			See description below (and Fig. E5)

PROCEDURE:

- Call up Service mode (press the “STOP” button on the remote control, then the “PLAY” button on the device, and hold down both buttons for approx. 5 seconds).
- In the Service menu, use the “▼” button to select the “SERVICE CONTROL MENU” line and press “▶”.
- Use the “▼” button to select the “TV ADJUSTMENTS” line and press “OK”.
- Start the playback
- Use the arrow buttons “◀” and “▶” to position the test picture precisely in the centre of the screen (left and right-hand corners are of equal size).
  Hold down the “OK” button for 5 seconds until “STORED” appears.

Note: The input can be cancelled by pressing the “MENU” button (Service menu is switched off). Pressing “MENU” again switches the Service menu back on.

3.8.4 Vertical picture position, picture amplitude and slope

Purpose: Set optimal vertical picture size and position

Consequences of incorrect settings:
Missing picture information on the edge of the screen, or a distorted picture.

TP	ADJ.	MODE	INPUT
	Service Menu	Service Mode, Playback	
TAPE		**MEAS. EQ**	**SPEC.**
VHS-Alignment Tape 4822 397 30103			See description below (and Fig. E5)

PROCEDURE:

- Call up Service mode (press the “STOP” button on the remote control, then the “PLAY” button on the device, and hold down both buttons for approx. 5 seconds).
- In the Service menu, use the “▼” button to select the “SERVICE CONTROL MENU” line and press “▶”.
- Use the “▼” button to select the “TV ADJUSTMENTS” line and press “OK”.
- Start the playback

1) Slope

- Press the “▼” button several times until “VERTICAL SLOPE” appears (the bottom half of the picture is blanked).
- Use the arrow keys “◀” and “▶” to set the middle line of the test picture precisely in the centre of the vertical screen.
- Hold down the “OK” button for 5 seconds until “STORED” appears.

2) Picture position

- Press the “▼” button several times until “VERTICAL SHIFT” appears.
- Use the arrow keys “◀” and “▶” to adjust the test picture in the vertical middle of the screen.
- Hold down the “OK” button for 5 seconds until “STORED” appears.

3) Picture amplitude

- Press the “▼” button several times until “VERTICAL AMPLITUDE” appears (the bottom half of the picture is blanked).
- Use the arrow keys “◀” and “▶” to set the bottom and the top edge of the circular test picture according to figure E5.
- Hold down the “OK” button for 5 seconds until “STORED” appears.

Note: The input can be cancelled by pressing the “MENU” button (Service menu is switched off). Pressing “MENU” again switches the Service menu back on.

3.8.5 East/West adjustments (for 25”only)

Purpose: Set optimal horizontal picture size and position

Consequences of incorrect settings:
Missing picture information on the edge of the screen, or a distorted picture.

PROCEDURE:

- Call up Service mode (press the “STOP” button on the remote control, then the “PLAY” button on the device, and hold down both buttons for approx. 5 seconds).
- In the Service menu, use the “▼” button to select the “SERVICE CONTROL MENU” line and press “▶”.
- Use the “▼” button to select the “TV ADJUSTMENTS” line and press “OK”.

1) East/West-width

TP	ADJ.	MODE	INPUT
	Service Menu	Service Mode, Playback	
TAPE		**MEAS. EQ**	**SPEC.**
VHS-Alignment Tape 4822 397 30103			See description below (and Fig. E5)

- Press the "▼" button several times until "E/W WIDTH" appears.
- Start the playback
- Use the arrow keys "◄" and "►" to adjust the test picture in the horizontal middle of the screen.
- Hold down the "OK" button for 5 seconds until "STORED" appears.

2) East/West-parabola

TP	ADJ.	MODE	INPUT
	Service Menu	TV	Crosshatch pattern on SCART
TAPE		**MEAS. EQ**	**SPEC.**
		Video Pattern Generator	See description below

- Activate TV-mode and apply a crosshatch pattern testpicture to the SCART input.
- Press the "▼" button several times until "E/W PARABOLA" appears.
- Use the arrow keys "◄" and "►" to adjust the left and right hand vertical lines to minimum distortions (see Fig. E6).
- Hold down the "OK" button for 5 seconds until "STORED" appears.

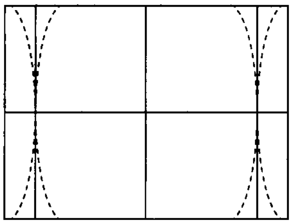


Fig. E6

3) East/West corner parabola

- Activate TV-mode and apply a crosshatch pattern testpicture to the SCART input.
- Press the "▼" button several times until "E/W CORNER" appears.
- Use the arrow keys "◄" and "►" to adjust the corners to minimum distortions (see Fig. E7).
- Hold down the "OK" button for 5 seconds until "STORED" appears.

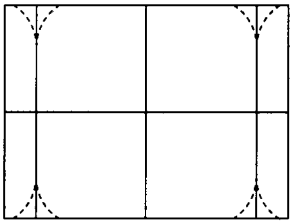


Fig. E7

4) East/West trapezium

- Activate TV-mode and apply a crosshatch pattern testpicture to the SCART input.
- Press the "▼" button several times until "E/W TRAPEZIUM" appears.
- Use the arrow keys "◄" and "►" to adjust the left and right hand vertical lines parallel to the screen edge (see Fig. E8)
- Hold down the "OK" button for 5 seconds until "STORED" appears.

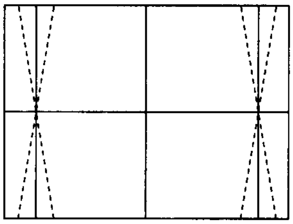


Fig. E8

3.8.6 Adjusting the whiteness

Purpose: Setting the R,G,B cathode ray currents

Consequences of incorrect settings:
Incorrect depiction of colours.

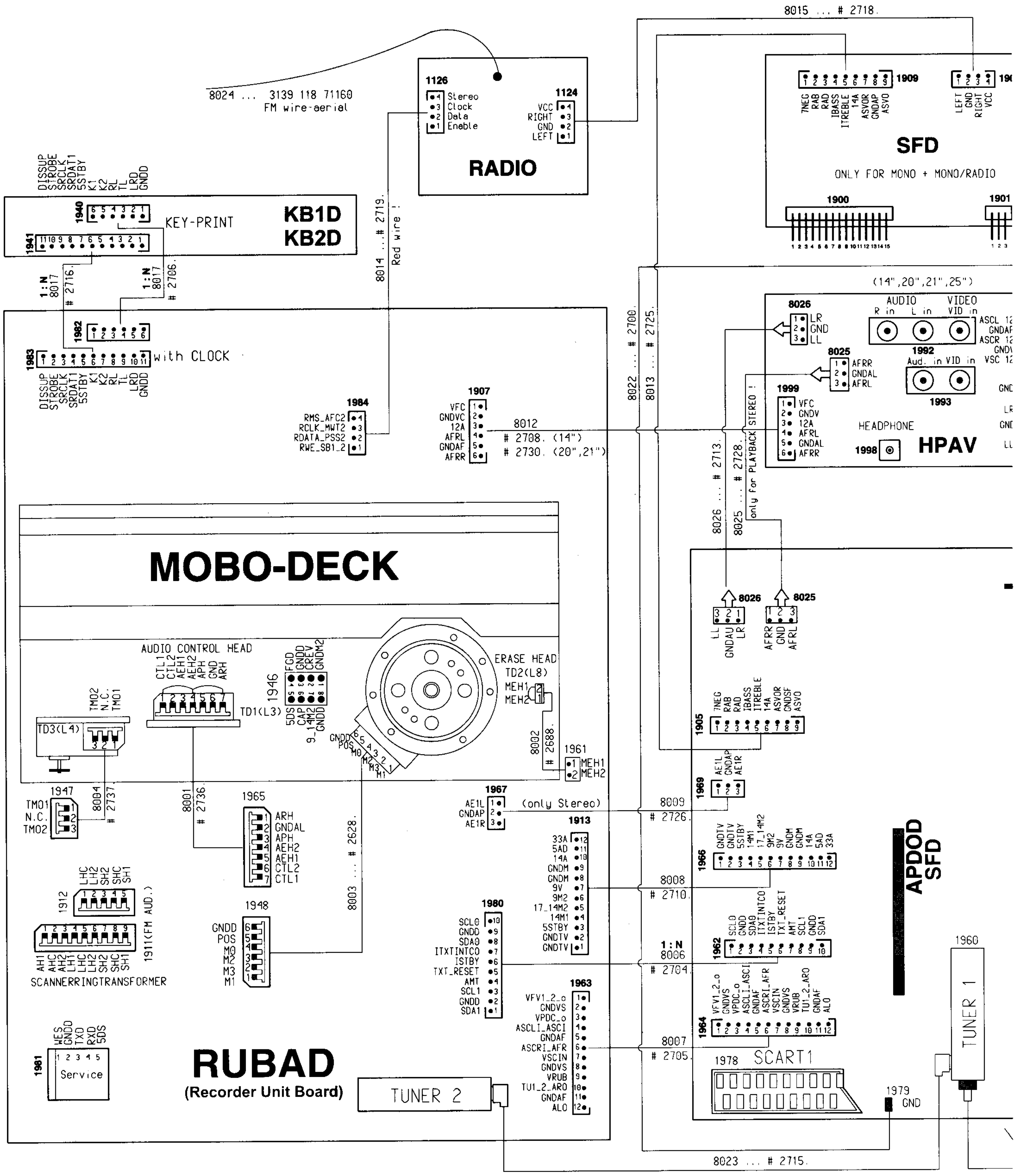
TP	ADJ.	MODE	INPUT
	Service Menu	TV	PAL-Black/White picture on SCART
TAPE		**MEAS. EQ**	**SPEC.**
		Video Pattern Generator	See description below

PROCEDURE:

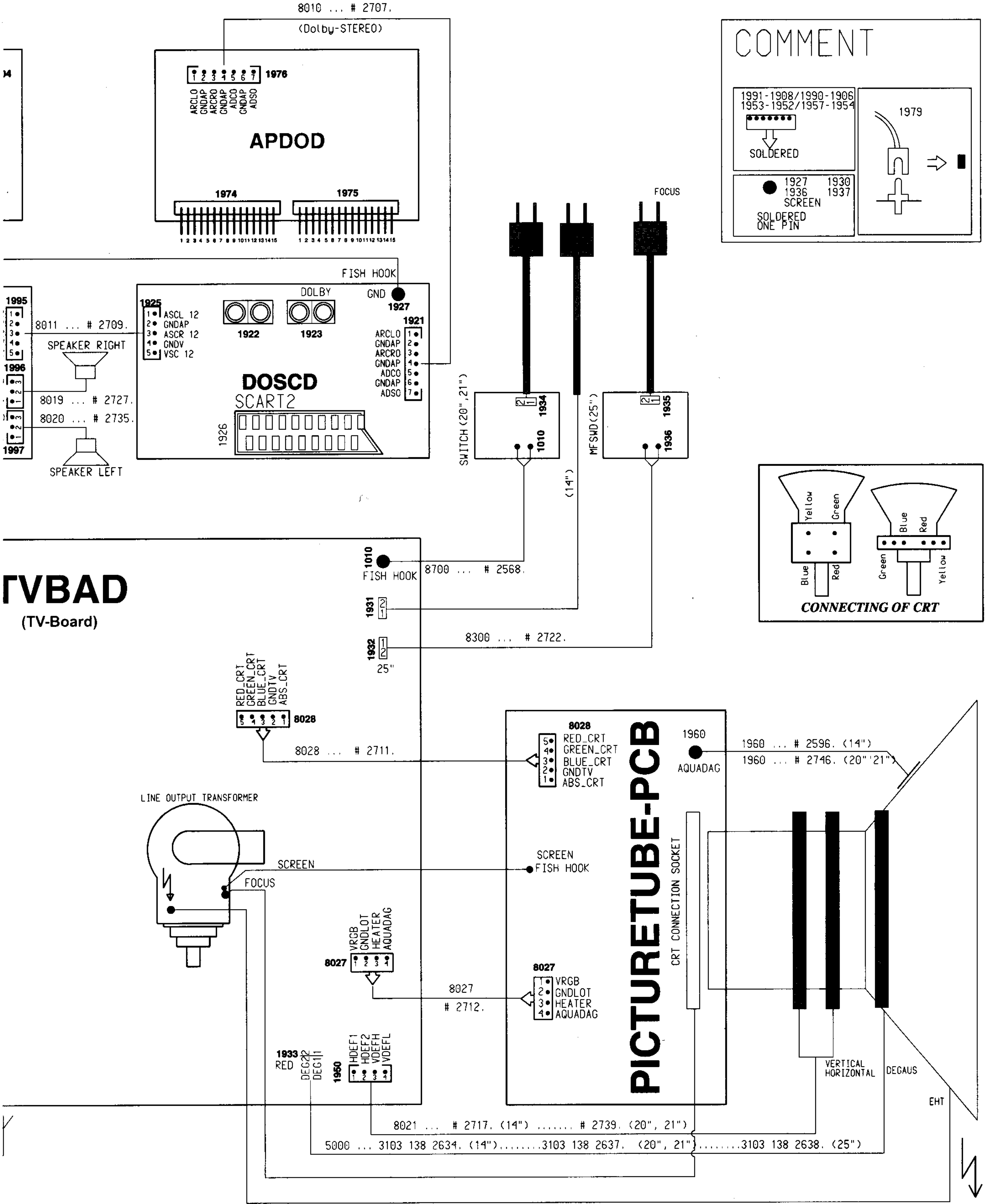
- Adjust the "SMART PICTURE" picture setting to "NATURAL" using the "SMART ▢" button.
- Set the tint in the "PICTURE" menu to "NATURAL".
- Call up Service mode (press the "STOP" button on the remote control, then the "PLAY" button on the device, and hold down both buttons for approx. 5 seconds).
- In the Service menu, use the "▼" button to select the "SERVICE CONTROL MENU" line and press "►".
- Use the "▼" button to select the "TV ADJUSTMENTS" line and press "OK".
- Press the "▼" button several times until "BLUE" appears.
- Use the "◄" and "►" arrow buttons to set the blue level required and hold down the "OK" button for 5 seconds until "STORED" appears.
- Press the "▼" button until "RED" appears.
- Use the "◄" and "►" arrow buttons to set the red level required and hold down the "OK" button for 5 seconds until "STORED" appears.
- If necessary, press the "▼" button several times until "BLUE" or "RED" appears, and repeat the adjustment.

Note: The setting for the green cathode "GREEN" should not be changed if possible.

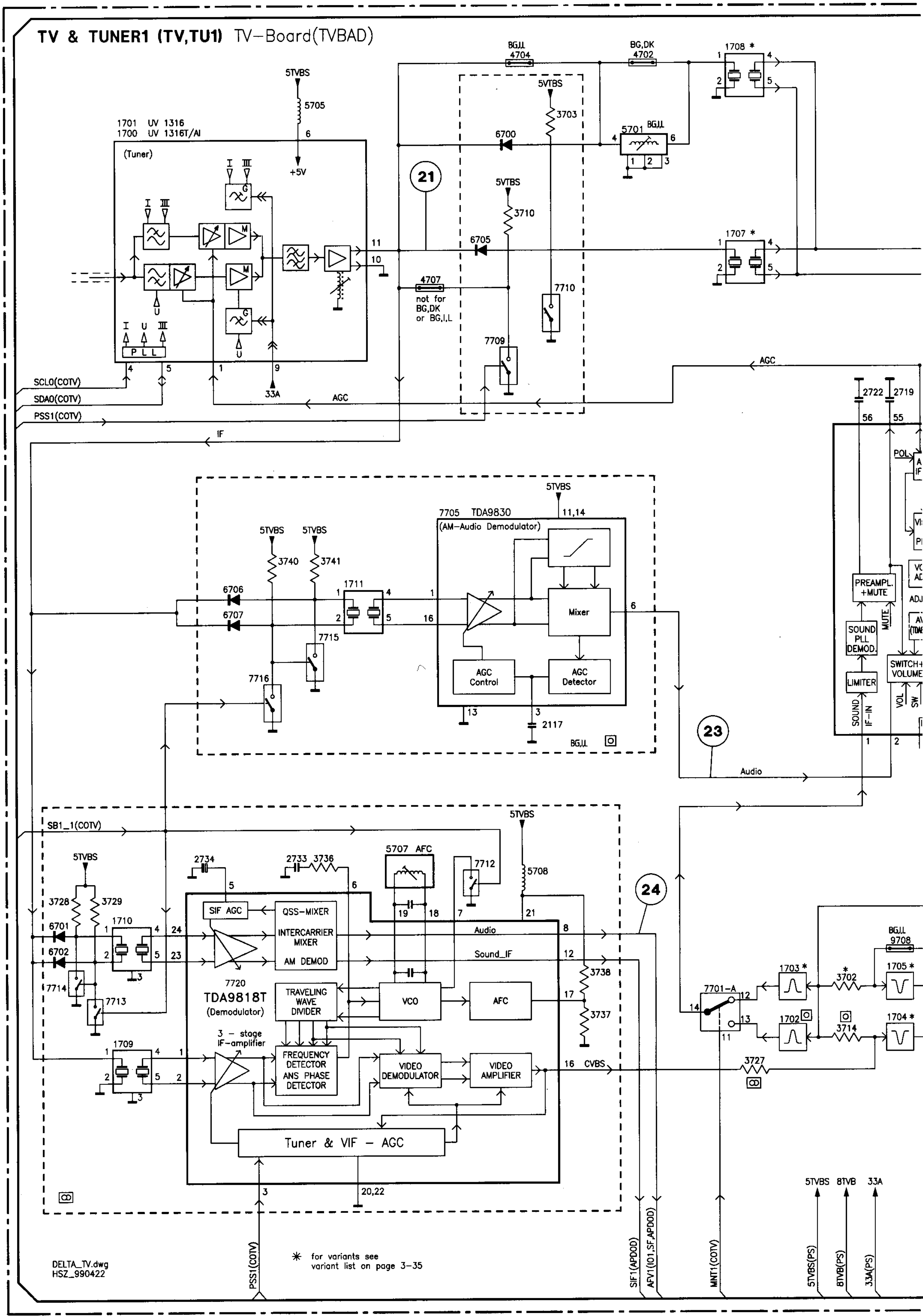
INTERCONNECTION WIRING DIAGRAM

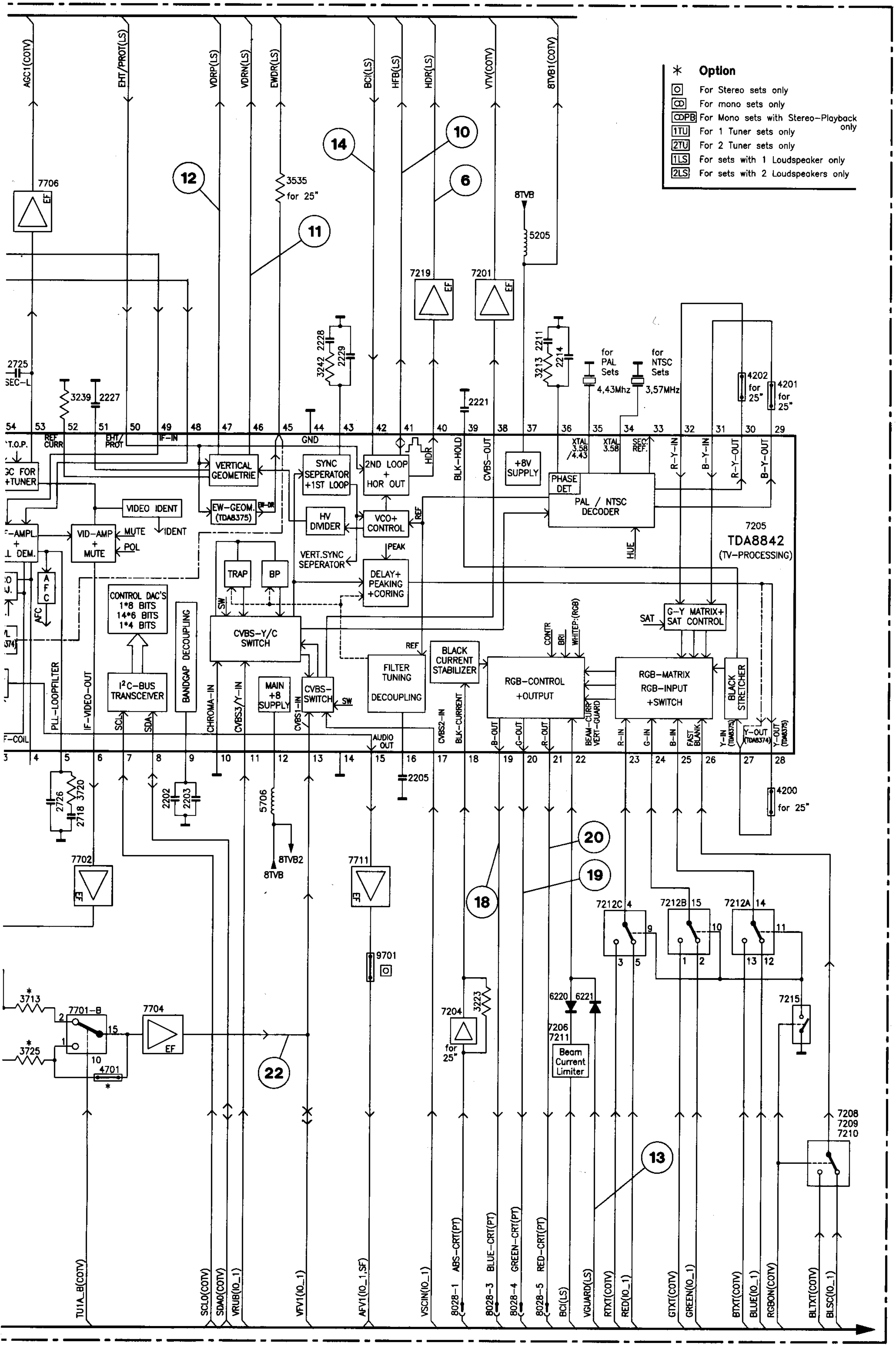

8015 ... # 2718.
8024 ... 3139 118 71160 FM wire-aerial
1126
Stereo
Clock
Data
Enable
1124
VCC
RIGHT
GND
LEFT
RADIO
1909
7NEG
RAB
RAD
IBASS
ITREBLE
14A
ASVOR
GNDAP
ASVO
LEFT
GND
RIGHT
VCC
SFD
ONLY FOR MONO + MONO/RADIO
1900
1901
DISSUP
STROBE
SRCLK
SRDAT1
5STBY
K1
K2
RL
TL
LRD
GNDD
1940
1941
KEY-PRINT
KB1D
KB2D
8014 ...# 2719.
Red wire !
1:N 8017 # 2716.
1:N 8017 # 2706.
1982
1983
with CLOCK
1984
RMS_AFC2
RCLK_MWT2
RDATA_PSS2
RWE_SB1_2
1907
VFC
GNDVC
12A
AFRL
GNDAF
AFRR
8012
# 2708. (14")
# 2730. (20",21")
8022 ... # 2700.
8013 ... # 2725.
(14",20",21",25")
AUDIO
R in
L in
VIDEO
VID in
8026
LR
GND
LL
ASCL 12
GNDAF
ASCR 12
8025
AFRR
GNDAL
AFRL
1992
Aud. in VID in
VSC 12
1999
VFC
GNDV
12A
AFRL
GNDAL
AFRR
1993
HEADPHONE
1998
HPAV
8026 ... # 2713.
8025 ... # 2728.
only for PLAYBACK STEREO !
MOBO-DECK
AUDIO CONTROL HEAD
CTL1
CTL2
AEH1
AEH2
APH
GND
ARH
TMO2
N.C.
TMO1
TD3(L4)
1946
FGD
GNDD
CREV
GNDM2
5DS
CAP
9_14M2
GNDD
TD1(L3)
ERASE HEAD
TD2(L8)
MEH1
MEH2
GNDD
POS
MO
M2
M3
M1
8002 ... # 2688.
1961
MEH1
MEH2
1947
TMO1
N.C.
TMO2
8004 # 2737.
8001 # 2736.
1965
ARH
GNDAL
APH
AEH2
AEH1
CTL2
CTL1
8003 ... # 2628.
1967
AE1L
GNDAP
AE1R
(only Stereo)
1913
33A
5AD
14A
GNDM
GNDM
9V
9M2
17_14M2
14M1
5STBY
GNDTV
GNDTV
1912
LHC
LH2
SH2
SHC
SH1
1911(FM AUD.)
AH1
AHC
AH2
LH1
LHC
LH2
SH2
SHC
SH1
SCANNERRINGTRANSFORMER
1948
GNDD
POS
M0
M2
M3
M1
1980
SCL0
GNDD
SDA0
ITXTINTCO
ISTBY
TXT_RESET
AMT
SCL1
GNDD
SDA1
1963
VFV1_2_o
GNDVS
VPDC_o
ASCLI_ASCI
GNDAF
ASCRI_AFR
VSCIN
GNDVS
VRUB
TU1_2_ARO
GNDAF
ALO
1981
WES
GNDD
TXD
RXD
5DS
Service
RUBAD
(Recorder Unit Board)
TUNER 2
8026
8025
LL
GNDAU
LR
AFRR
GND
AFRL
1905
7NEG
RAB
RAD
IBASS
ITREBLE
14A
ASVOR
GNDSF
ASVO
1969
AE1L
GNDAP
AE1R
8009
# 2726.
1966
GNDTV
GNDTV
5STBY
14M1
17_14M2
9M2
9V
GNDM
GNDM
14A
5AD
33A
8008
# 2710.
1962
SCL0
GNDD
SDA0
ITXTINTCO
ISTBY
TXT_RESET
AMT
SCL1
GNDD
SDA1
1:N
8006
# 2704.
1964
VFV1_2_o
GNDVS
VPDC_o
ASCLI_ASCI
GNDAF
ASCRI_AFR
VSCIN
GNDVS
VRUB
TU1_2_ARO
GNDAF
ALO
8007
# 2705.
1978
SCART1
1979
GND
APDOD
SFD
1960
TUNER 1
8023 ... # 2715.

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	


8010 ... # 2707.
(Dolby-STEREO)
1976
ARCLO
GNDAP
ARCRO
GNDAP
ADCO
GNDAP
ADSO
APDOD
1974
1975
COMMENT
1991-1908/1990-1906
1953-1952/1957-1954
SOLDERED
1979
1927 1930
1936 1937
SCREEN
SOLDERED
ONE PIN
FOCUS
FISH HOOK
GND
1927
DOLBY
1995
8011 ... # 2709.
SPEAKER RIGHT
1925
ASCL 12
GNDAP
ASCR 12
GNDV
VSC 12
1922
1923
1921
ARCLO
GNDAP
ARCRO
GNDAP
ADCO
GNDAP
ADSO
1996
8019 ... # 2727.
8020 ... # 2735.
1997
SPEAKER LEFT
DOSCD
SCART2
1926
SWITCH (20",21")
1934
1010
MFSWD (25")
1935
1936
(14")
Yellow
Green
Blue
Red
Blue
Red
Green
Yellow
CONNECTING OF CRT
TVBAD
(TV-Board)
1010
FISH HOOK
8700 ... # 2568.
1931
1932
8300 ... # 2722.
25"
RED_CRT
GREEN_CRT
BLUE_CRT
GNDTV
ABS_CRT
8028
8028 ... # 2711.
8028
RED_CRT
GREEN_CRT
BLUE_CRT
GNDTV
ABS_CRT
1960
AQUADAG
1960 ... # 2596. (14")
1960 ... # 2746. (20" 21")
PICTURETUBE-PCB
CRT CONNECTION SOCKET
LINE OUTPUT TRANSFORMER
SCREEN
FOCUS
SCREEN
FISH HOOK
VRGB
GNDLOT
HEATER
AQUADAG
8027
8027
# 2712.
8027
VRGB
GNDLOT
HEATER
AQUADAG
1933
RED
DEG2
DEG1
1950
HDEF1
HDEF2
VDEFH
VDEFL
VERTICAL
HORIZONTAL
DEGAUS
EHT
8021 ... # 2717. (14") .... # 2739. (20", 21")
5000 ... 3103 138 2634. (14")........3103 138 2637. (20", 21")........3103 138 2638. (25")

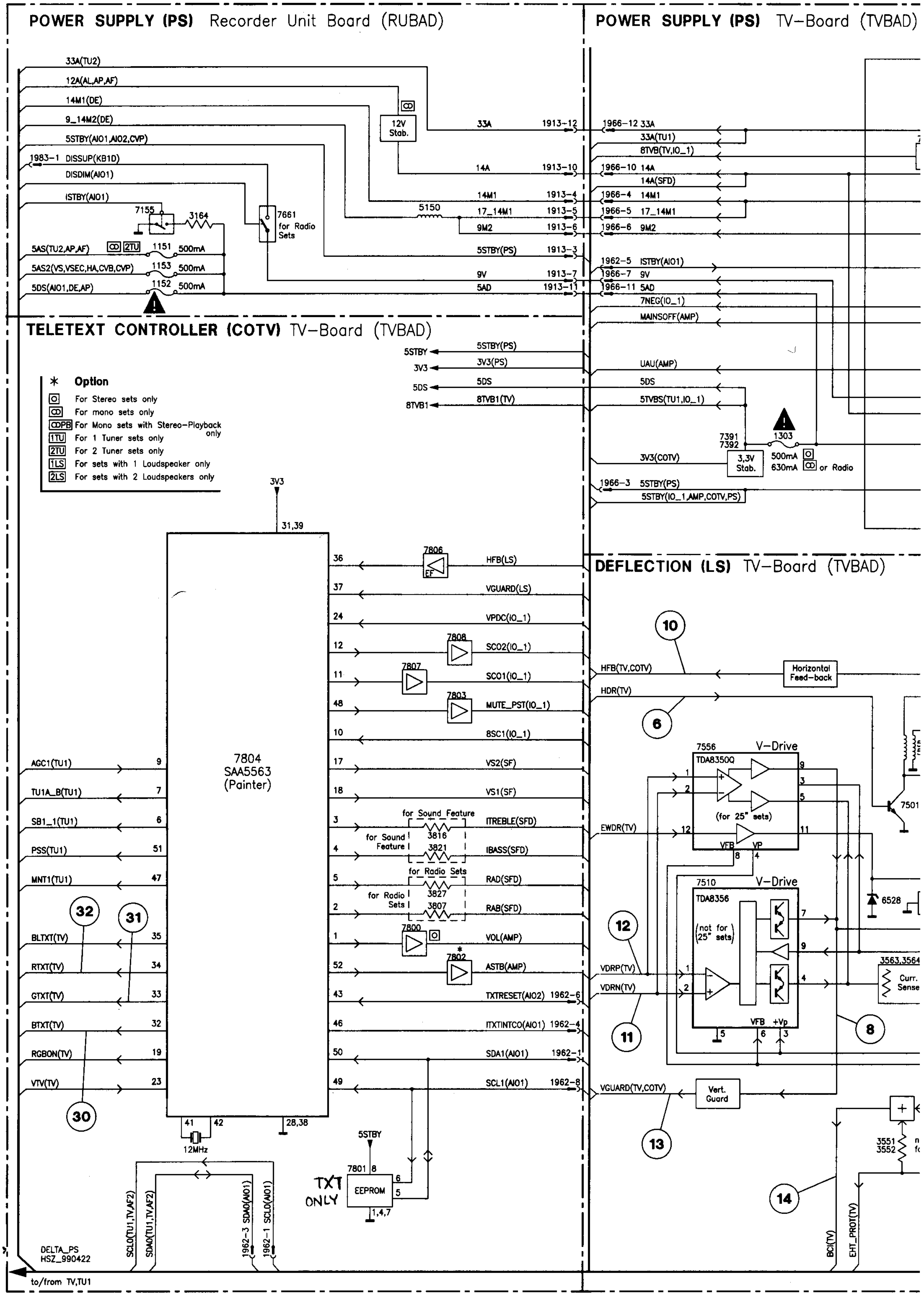
TUNER 1 AND TV - BLOCK DIAGRAM


TV & TUNER1 (TV,TU1) TV–Board(TVBAD)
1701 UV 1316
1700 UV 1316T/AI
(Tuner)
5TVBS
5705
6
+5V
I III
I U III
P L L
U
G
M
11
10
4
5
1
9
33A
AGC
SCLO(COTV)
SDA0(COTV)
PSS1(COTV)
IF
21
BG,I,L
4704
BG,DK
4702
5VTBS
3703
6700
5701 BG,I,L
4 6
1 2 3
1708 *
1707 *
5VTBS
3710
6705
4707
not for
BG,DK
or BG,I,L
7710
7709
AGC
2722
2719
56
55
POL
PREAMPL.
+MUTE
MUTE
SOUND
PLL
DEMOD.
LIMITER
SWITCH+
VOLUME
VOL
SW
SOUND
IF-IN
ADJ
5TVBS
7705 TDA9830
11,14
(AM–Audio Demodulator)
5TVBS
5TVBS
3740
3741
6706
6707
1711
7715
7716
Mixer
AGC
Control
AGC
Detector
13
3
2117
6
16
BG,I,L
23
Audio
SB1_1(COTV)
5TVBS
5TVBS
5708
2734
2733 3736
5707 AFC
7712
3728
3729
6701
6702
1710
7714
7713
24
23
5
6
19
18
7
21
SIF AGC
QSS–MIXER
INTERCARRIER
MIXER
AM DEMOD
Audio
Sound_IF
8
12
7720
TDA9818T
(Demodulator)
TRAVELING
WAVE
DIVIDER
VCO
AFC
17
3738
3737
3 – stage
IF–amplifier
1709
FREQUENCY
DETECTOR
ANS PHASE
DETECTOR
VIDEO
DEMODULATOR
VIDEO
AMPLIFIER
16 CVBS
Tuner & VIF – AGC
3
20,22
24
7701–A
14
12
13
11
BG,I,L
9708
1703 *
3702 *
1705 *
1702
3714
1704 *
3727
5TVBS 8TVB 33A
DELTA_TV.dwg
HSZ_990422
PSS1(COTV)
* for variants see
variant list on page 3–35
SIF1(APDOD)
AFV1(IO1,SF,APDOD)
MNT1(COTV)
5TVBS(PS)
8TVB(PS)
33A(PS)

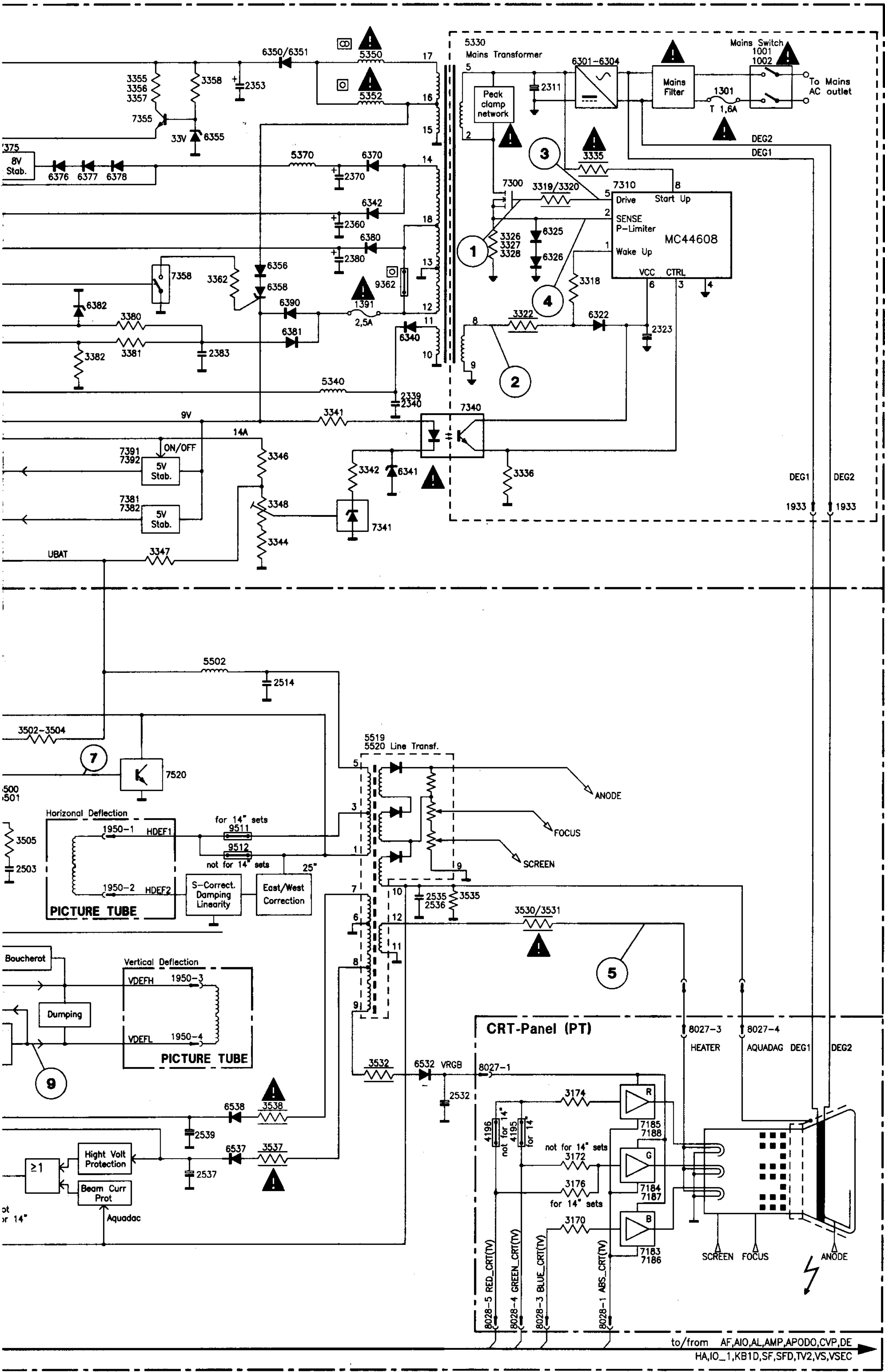

AGC1(COTV)
EHT/PROT(LS)
VDRP(LS)
VDRN(LS)
EWDR(LS)
BCI(LS)
HFB(LS)
HDR(LS)
VTV(COTV)
8TVB1(COTV)
7706
EF
12
14
10
6
11
3535
for 25"
8TVB
5205
7219
7201
2725
SEC-L
3239
2227
2228
2229
3242
2221
2211
2214
3213
for PAL Sets
4,43Mhz
for NTSC Sets
3,57MHz
4202
for 25"
4201
for 25"
54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29
T.O.P.
REF CURR
EHT/ PROT
IF-IN
GND
AGC FOR +TUNER
VERTICAL GEOMETRIE
SYNC SEPERATOR +1ST LOOP
2ND LOOP + HOR OUT
HDR
BLK-HOLD
CVBS-OUT
+8V SUPPLY
XTAL 3.58 /4.43
XTAL 3.58
SEC REF.
R-Y-IN
B-Y-IN
R-Y-OUT
B-Y-OUT
PHASE DET
PAL / NTSC DECODER
VIDEO IDENT
EW-GEOM. (TDA8375)
EW-DR
HV DIVIDER
VCO+ CONTROL
REF
IF-AMPL. + PLL DEM.
VID-AMP + MUTE
MUTE
IDENT
POL
7205
TDA8842
(TV-PROCESSING)
HUE
PEAK
VERT.SYNC SEPERATOR
TRAP
BP
DELAY+ PEAKING +CORING
AFC
CONTROL DAC'S 1*8 BITS 14*6 BITS 1*4 BITS
BANDGAP DECOUPLING
SW
CVBS-Y/C SWITCH
G-Y MATRIX+ SAT CONTROL
SAT
CONTR
BRI
WHITEP.(RGB)
REF
BLACK CURRENT STABILIZER
FILTER TUNING DECOUPLING
RGB-CONTROL +OUTPUT
RGB-MATRIX RGB-INPUT +SWITCH
BLACK STRETCHER
I²C-BUS TRANSCEIVER
MAIN +8 SUPPLY
CVBS-SWITCH
SW
IF-COIL
PLL-LOOPFILTER
IF-VIDEO-OUT
SCL
SDA
CHROMA-IN
CVBS3/Y-IN
CVBS1-IN
AUDIO OUT
CVBS2-IN
BLK-CURRENT
B-OUT
G-OUT
R-OUT
BEAM-CURR VERT-GUARD
R-IN
G-IN
B-IN
FAST BLANK
Y-IN (TDA8375)
Y-OUT (TDA8374)
Y-OUT (TDA8375)
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
2726
3720
2718
2202
2203
5706
8TVB2
8TVB
2205
4200
for 25"
7702
EF
7711
EF
20
19
18
7212C 4
9
3 5
7212B 15
10
1 2
7212A 14
11
13 12
9701
3713
*
7701-B
2
1
15
10
3725
*
4701
*
7704
EF
22
7204
for 25"
3223
6220
6221
7206
7211
Beam Current Limiter
7215
13
7208
7209
7210
TU1A_B(COTV)
SCL0(COTV)
SDA0(COTV)
VRUB(IO_1)
VFV1(IO_1)
AFV1(IO_1,SF)
VSCIN(IO_1)
8028-1 ABS-CRT(PT)
8028-3 BLUE-CRT(PT)
8028-4 GREEN-CRT(PT)
8028-5 RED-CRT(PT)
BCI(LS)
VGUARD(LS)
RTXT(COTV)
RED(IO_1)
GTXT(COTV)
GREEN(IO_1)
BTXT(COTV)
BLUE(IO_1)
RGBON(COTV)
BLTXT(COTV)
BLSC(IO_1)

*	**Option**
O	For Stereo sets only
OO	For mono sets only
OOPB	For Mono sets with Stereo-Playback only
1TU	For 1 Tuner sets only
2TU	For 2 Tuner sets only
1LS	For sets with 1 Loudspeaker only
2LS	For sets with 2 Loudspeakers only

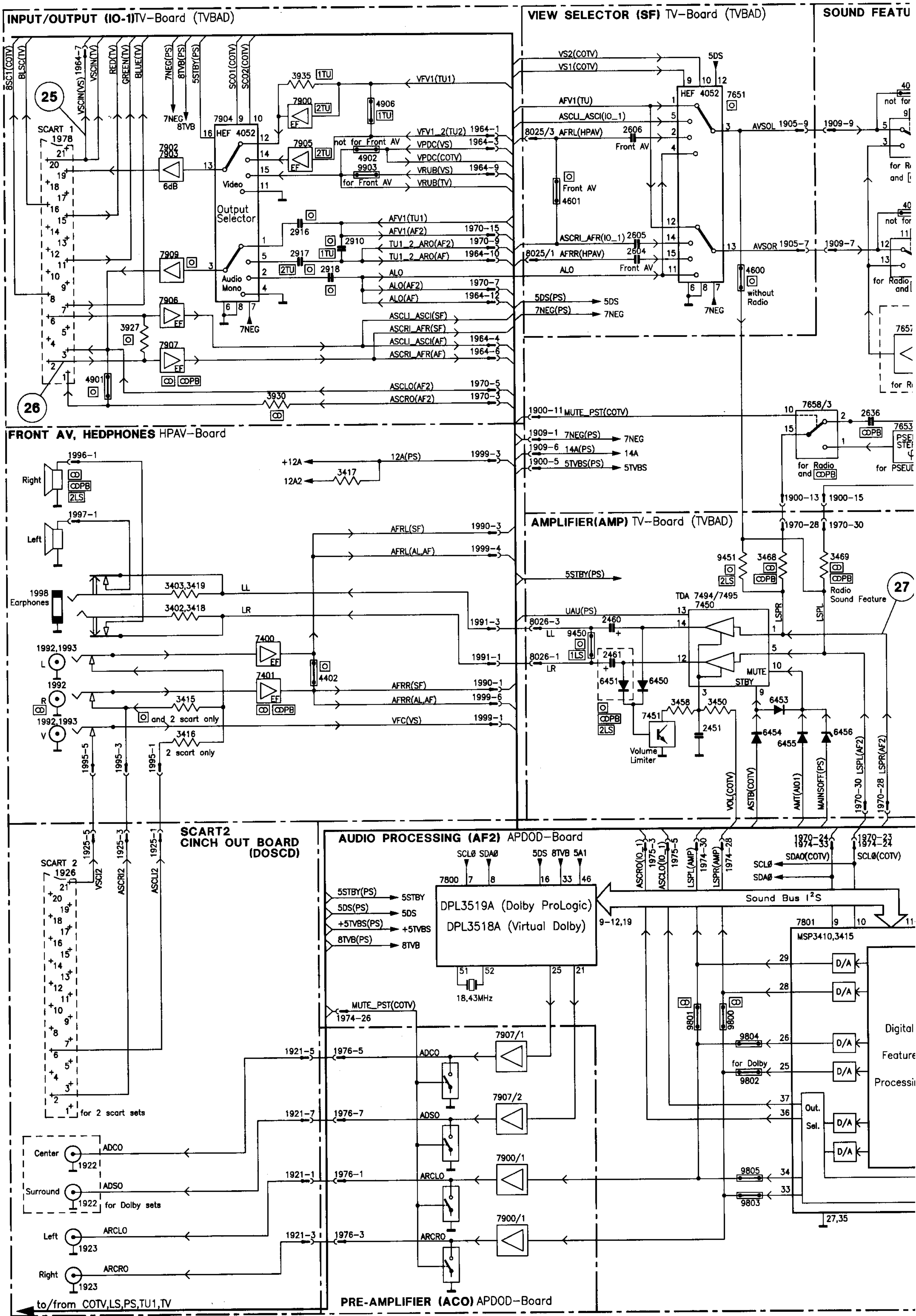
POWER SUPPLY, LARGE SIGNAL AND TXT - BLOCK DIAGR

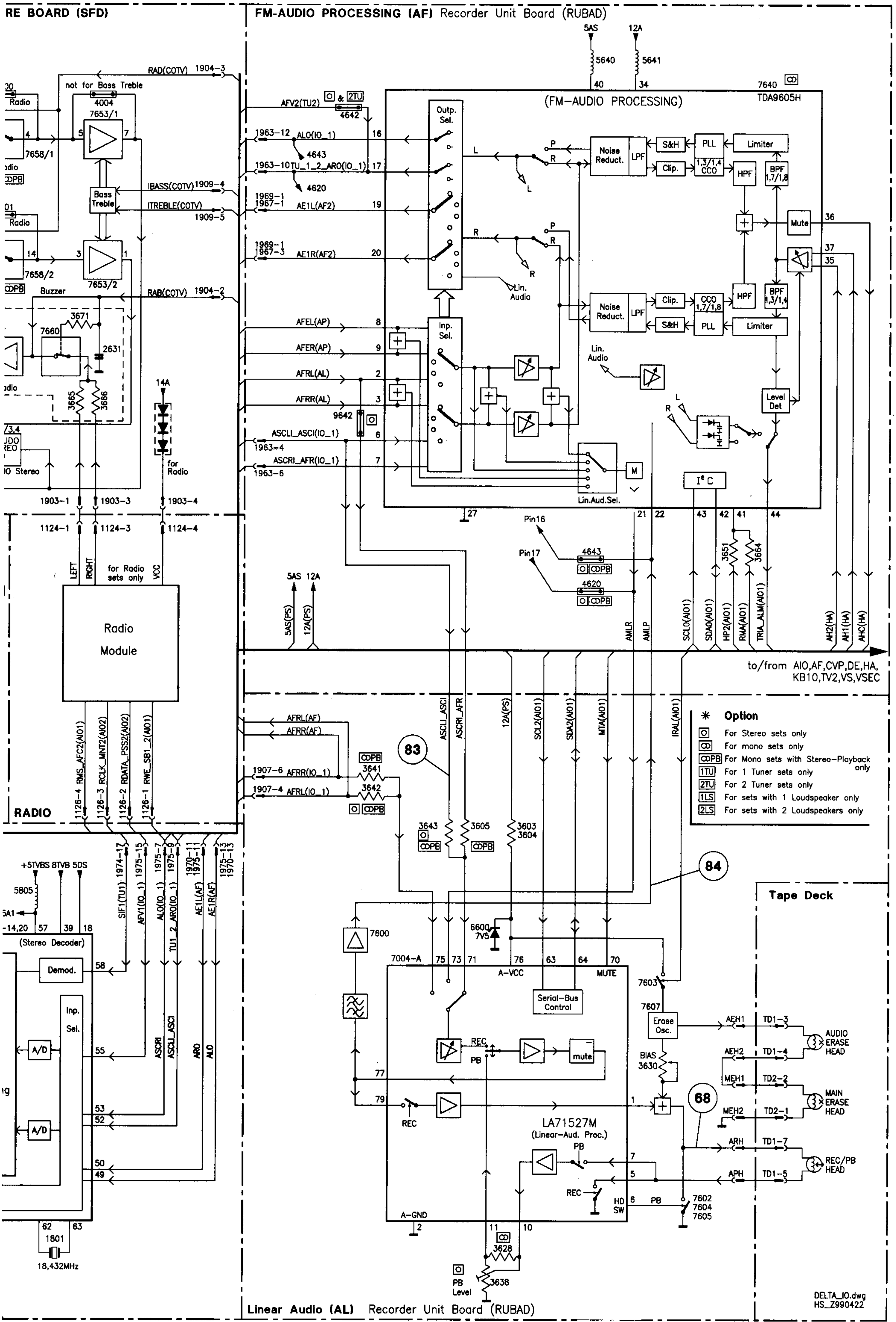

POWER SUPPLY (PS) Recorder Unit Board (RUBAD)
33A(TU2)
12A(AL,AP,AF)
14M1(DE)
9_14M2(DE)
5STBY(AIO1,AIO2,CVP)
1983-1 DISSUP(KB1D)
DISDIM(AIO1)
ISTBY(AIO1)
7155
3164
7661 for Radio Sets
12V Stab.
5150
5AS(TU2,AP,AF)
1151 500mA
5AS2(VS,VSEC,HA,CVB,CVP)
1153 500mA
5DS(AIO1,DE,AP)
1152 500mA
33A 1913-12
14A 1913-10
14M1 1913-4
17_14M1 1913-5
9M2 1913-6
5STBY(PS) 1913-3
9V 1913-7
5AD 1913-11
POWER SUPPLY (PS) TV-Board (TVBAD)
1966-12 33A
33A(TU1)
8TVB(TV,IO_1)
1966-10 14A
14A(SFD)
1966-4 14M1
1966-5 17_14M1
1966-6 9M2
1962-5 ISTBY(AIO1)
1966-7 9V
1966-11 5AD
7NEG(IO_1)
MAINSOFF(AMP)
UAU(AMP)
5DS
5TVBS(TU1,IO_1)
7391
7392
1303
3V3(COTV)
3,3V Stab.
500mA
630mA or Radio
1966-3 5STBY(PS)
5STBY(IO_1,AMP,COTV,PS)
TELETEXT CONTROLLER (COTV) TV-Board (TVBAD)
5STBY 5STBY(PS)
3V3 3V3(PS)
5DS 5DS
8TVB1 8TVB1(TV)
* Option
For Stereo sets only
For mono sets only
For Mono sets with Stereo-Playback only
1TU For 1 Tuner sets only
2TU For 2 Tuner sets only
1LS For sets with 1 Loudspeaker only
2LS For sets with 2 Loudspeakers only
3V3
31,39
7804
SAA5563
(Painter)
AGC1(TU1) 9
TU1A_B(TU1) 7
SB1_1(TU1) 6
PSS(TU1) 51
MNT1(TU1) 47
BLTXT(TV) 35
RTXT(TV) 34
GTXT(TV) 33
BTXT(TV) 32
RGBON(TV) 19
VTV(TV) 23
32
31
30
36 7806 EF HFB(LS)
37 VGUARD(LS)
24 VPDC(IO_1)
12 7808 SCO2(IO_1)
11 7807 SCO1(IO_1)
48 7803 MUTE_PST(IO_1)
10 8SC1(IO_1)
17 VS2(SF)
18 VS1(SF)
for Sound Feature
3 3816 ITREBLE(SFD)
for Sound Feature
4 3821 IBASS(SFD)
for Radio Sets
5 3827 RAD(SFD)
for Radio Sets
2 3807 RAB(SFD)
1 7800 VOL(AMP)
52 7802 * ASTB(AMP)
43 TXTRESET(AIO2) 1962-6
46 ITXTINTCO(AIO1) 1962-4
50 SDA1(AIO1) 1962-1
49 SCL1(AIO1) 1962-8
41 42 28,38
12MHz
5STBY
7801 8
TXT ONLY
EEPROM
6
5
1,4,7
SCL0(TU1,TV,AF2)
SDA0(TU1,TV,AF2)
1962-3 SDA0(AIO1)
1962-1 SCL0(AIO1)
DELTA_PS
HSZ_990422
to/from TV,TU1
DEFLECTION (LS) TV-Board (TVBAD)
10
HFB(TV,COTV)
Horizontal Feed-back
HDR(TV)
6
7556 V-Drive
TDA8350Q
1
2
9
3
5
(for 25" sets)
EWDR(TV) 12
11
VFB 8
VP 4
7501
6528
7510 V-Drive
TDA8356
(not for 25" sets)
7
9
4
12
VDRP(TV) 1
VDRN(TV) 2
11
VFB +Vp
5 6 3
8
3563,3564
Curr. Sense
VGUARD(TV,COTV)
Vert. Guard
13
+
3551
3552
14
BCI(TV)
EHT_PROT(TV)

AM

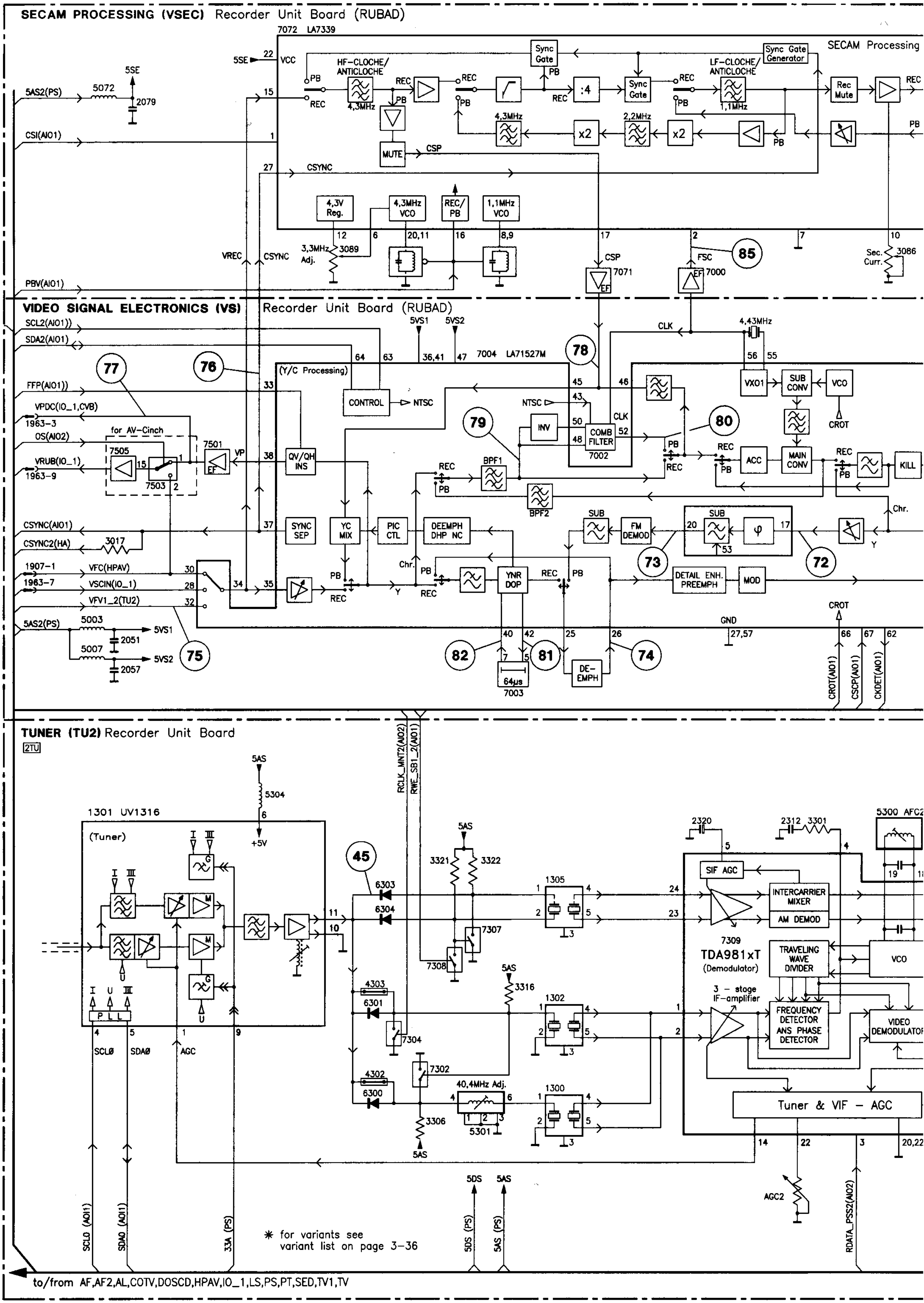

5330
Mains Transformer
Peak clamp network
2311
6301-6304
Mains Filter
Mains Switch
1001
1002
To Mains AC outlet
1301
T 1,6A
DEG2
DEG1
3335
7310
Drive
Start Up
SENSE
P-Limiter
MC44608
Wake Up
VCC
CTRL
7300
3319/3320
3326
3327
3328
6325
6326
3318
3322
6322
2323
7340
3336
DEG1
DEG2
1933
1933
6350/6351
5350
5352
17
16
15
14
18
13
12
11
10
3355
3356
3357
3358
2353
7355
33V
6355
7375
8V Stab.
6376
6377
6378
5370
6370
2370
6342
2360
6380
2380
7358
3362
6356
6358
9362
6382
6390
1391
2,5A
3380
3381
3382
2383
6381
6340
5340
2339
2340
9V
3341
14A
3346
ON/OFF
7391
7392
5V Stab.
7381
7382
5V Stab.
3342
6341
3348
7341
3344
UBAT
3347
5502
2514
3502-3504
7520
5500
5501
3505
2503
Horizonal Deflection
1950-1
HDEF1
1950-2
HDEF2
PICTURE TUBE
for 14" sets
9511
9512
not for 14" sets
25"
S-Correct. Damping Linearity
East/West Correction
5519
5520 Line Transf.
5
3
1
7
6
8
9
10
12
11
9
ANODE
FOCUS
SCREEN
2535
2536
3535
3530/3531
Boucherot
Dumping
Vertical Deflection
VDEFH
1950-3
VDEFL
1950-4
PICTURE TUBE
6538
3538
2539
Hight Volt Protection
≥1
Beam Curr Prot
6537
3537
2537
Aquadac
not for 14"
3532
6532
VRGB
2532
8027-1
CRT-Panel (PT)
8027-3
HEATER
8027-4
AQUADAG
DEG1
DEG2
3174
R
7185
7188
4196
not for 14"
4195
for 14"
not for 14" sets
3172
G
3176
for 14" sets
7184
7187
3170
B
7183
7186
SCREEN
FOCUS
ANODE
8028-5 RED_CRT(TV)
8028-4 GREEN_CRT(TV)
8028-3 BLUE_CRT(TV)
8028-1 ABS_CRT(TV)
to/from AF,AIO,AL,AMP,APODO,CVP,DE
HA,IO_1,KB1D,SF,SFD,TV2,VS,VSEC
①
②
③
④
⑤
⑦
⑨

IN/OUT AND AUDIO PROCESSING - BLOCK DIAGRAM

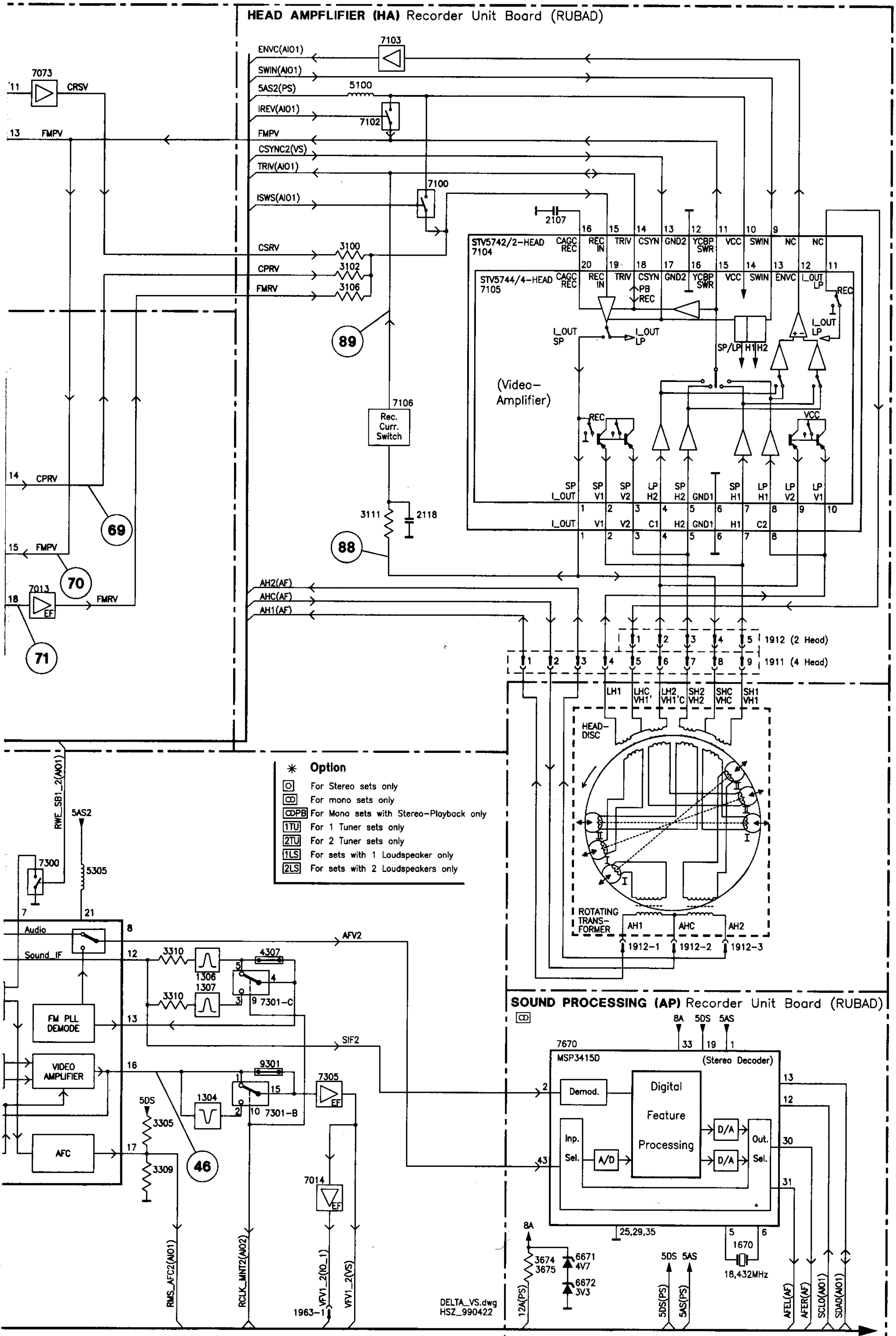

INPUT/OUTPUT (IO-1) TV-Board (TVBAD)
VIEW SELECTOR (SF) TV-Board (TVBAD)
SOUND FEATU
FRONT AV, HEDPHONES HPAV-Board
AMPLIFIER(AMP) TV-Board (TVBAD)
SCART2 CINCH OUT BOARD (DOSCD)
AUDIO PROCESSING (AF2) APDOD-Board
PRE-AMPLIFIER (ACO) APDOD-Board
25
26
27
SCART 1
1978
SCART 2
1926
for 2 scart sets
8SC1(COTV)
BLSC(TV)
VSCIN(VS) 1964-7
VSCIN(TV)
RED(TV)
GREEN(TV)
BLUE(TV)
7NEG(PS)
8TVB(PS)
5STBY(PS)
SCO1(COTV)
SCO2(COTV)
7NEG
8TVB
7902
7903
6dB
7909
7906
7907
EF
3927
4901
3930
HEF 4052
Output Selector
Video
Audio Mono
7904
3935
1TU
7900
2TU
7905
4906
4902
9903
not for Front AV
for Front AV
2916
2917
2910
2918
VFV1(TU1)
VFV1_2(TU2) 1964-1
VPDC(VS) 1964-3
VPDC(COTV)
VRUB(VS) 1964-9
VRUB(TV)
AFV1(TU1)
AFV1(AF2) 1970-15
TU1_2_ARO(AF2) 1970-9
TU1_2_ARO(AF) 1964-10
ALO
ALO(AF2) 1970-7
ALO(AF) 1964-12
ASCLI_ASCI(SF)
ASCRI_AFR(SF)
ASCLI_ASCI(AF) 1964-4
ASCRI_AFR(AF) 1964-6
ASCLO(AF2) 1970-5
ASCRO(AF2) 1970-3
VS2(COTV)
VS1(COTV)
5DS
AFV1(TU)
ASCLI_ASCI(IO_1)
8025/3 AFRL(HPAV)
2606
Front AV
4601
ASCRI_AFR(IO_1) 2605
8025/1 AFRR(HPAV)
2604
7651
AVSOL 1905-9
1909-9
AVSOR 1905-7
1909-7
4600
without Radio
5DS(PS)
7NEG(PS)
not for
for Radio and
7657
1900-11 MUTE_PST(COTV)
7658/3
2636
7653
for Radio and
for PSEU
1909-1 7NEG(PS) 7NEG
1909-6 14A(PS) 14A
1900-5 5TVBS(PS) 5TVBS
1900-13
1900-15
1970-28
1970-30
+12A
12A(PS) 1999-3
3417
12A2
Right
1996-1
Left
1997-1
2LS
1998 Earphones
3403,3419 LL
3402,3418 LR
AFRL(SF) 1990-3
AFRL(AL,AF) 1999-4
5STBY(PS)
1991-3
1991-1
1992,1993 L
1992 R
1992,1993 V
7400
7401
4402
AFRR(SF) 1990-1
AFRR(AL,AF) 1999-6
3415
and 2 scart only
3416
2 scart only
VFC(VS) 1999-1
1995-5
1995-3
1995-1
1925-5
1925-3
1925-1
VSCI2
ASCRI2
ASCLI2
9451
3468
3469
Radio Sound Feature
TDA 7494/7495 7450
UAU(PS)
8026-3 LL
8026-1 LR
9450
1LS
2460
2461
6451
6450
MUTE STBY
LSPR
LSPL
3458
3450
7451
Volume Limiter
2451
6453
6454
6455
6456
VOL(COTV)
ASTB(COTV)
AMT(AO01)
MAINSOFF(PS)
1970-30 LSPL(AF2)
1970-28 LSPR(AF2)
SCL0 SDA0
5DS 8TVB 5A1
7800
DPL3519A (Dolby ProLogic)
DPL3518A (Virtual Dolby)
18,43MHz
5STBY(PS) 5STBY
5DS(PS) 5DS
+5TVBS(PS) +5TVBS
8TVB(PS) 8TVB
MUTE_PST(COTV) 1974-26
ASCRO(IO_1) 1975-3
ASCLO(IO_1) 1975-5
LSPL(AMP) 1974-30
LSPR(AMP) 1974-28
1970-24 1974-33 SDA0(COTV)
1970-23 1974-24 SCL0(COTV)
SCL0
SDA0
Sound Bus I²S
7801
MSP3410,3415
D/A
Digital Feature Processi
Out. Sel.
9801
9800
9804
for Dolby 9802
9805
9803
27,35
1921-5 1976-5 ADCO
1921-7 1976-7 ADSO
1921-1 1976-1 ARCLO
1921-3 1976-3 ARCRO
7907/1
7907/2
7900/1
Center 1922
Surround 1922
for Dolby sets
Left 1923
Right 1923
to/from COTV,LS,PS,TU1,TV


RE BOARD (SFD)
FM-AUDIO PROCESSING (AF) Recorder Unit Board (RUBAD)
5AS
12A
5640
5641
40
34
7640
TDA9605H
(FM-AUDIO PROCESSING)
RAD(COTV) 1904-3
not for Bass Treble
4004
7653/1
Radio
7658/1
Bass Treble
IBASS(COTV) 1909-4
ITREBLE(COTV) 1909-5
7658/2
7653/2
Buzzer
RAB(COTV) 1904-2
3671
7660
2631
3665
3666
14A
for Radio
AFV2(TU2)
4642
1963-12 ALO(IO_1)
4643
1963-10 TU_1_2_ARO(IO_1)
4620
1969-1 1967-1 AE1L(AF2)
1969-1 1967-3 AE1R(AF2)
Outp. Sel.
Noise Reduct.
LPF
S&H
PLL
Limiter
Clip.
1,3/1,4 CCO
HPF
BPF 1,7/1,8
BPF 1,3/1,4
CCO 1,7/1,8
Mute
Lin. Audio
AFEL(AP)
AFER(AP)
AFRL(AL)
AFRR(AL)
9642
ASCLI_ASCI(IO_1)
1963-4
ASCRI_AFR(IO_1)
1963-6
Inp. Sel.
Level Det
Lin.Aud.Sel.
M
I²C
1903-1
1903-3
1903-4
1124-1
1124-3
1124-4
LEFT
RIGHT
for Radio sets only
VCC
Radio Module
Pin16
Pin17
4643
4620
5AS(PS)
12A(PS)
AMLR
AMLP
SCL0(AIO1)
SDA0(AIO1)
HP2(AIO1)
RMA(AIO1)
TRIA_ALM(AIO1)
3651
3664
AH2(HA)
AH1(HA)
AHC(HA)
to/from AIO,AF,CVP,DE,HA, KB10,TV2,VS,VSEC
RMS_AFC2(AIO1)
RCLK_MNT2(AIO2)
RDATA_PSS2(AIO2)
RWE_SB1_2(AIO1)
1126-4
1126-3
1126-2
1126-1
RADIO
AFRL(AF)
AFRR(AF)
1907-6 AFRR(IO_1)
1907-4 AFRL(IO_1)
3641
3642
ASCLI_ASCI
ASCRI_AFR
12A(PS)
SCL2(AIO1)
SDA2(AIO1)
MTA(AIO1)
IRAL(AIO1)
83
84
68
3643
3605
3603
3604
✳ Option
▣ For Stereo sets only
⊚ For mono sets only
⊚PB For Mono sets with Stereo-Playback only
1TU For 1 Tuner sets only
2TU For 2 Tuner sets only
1LS For sets with 1 Loudspeaker only
2LS For sets with 2 Loudspeakers only
+5TVBS 8TVB 5DS
5805
SIF1(TU1) 1974-17
AFV1(IO_1) 1975-15
ALO(IO_1) 1975-7
TU1_2_ARO(IO_1) 1975-9
AE1L(AF) 1970-11 1975-11
AE1R(AF) 1975-13 1970-13
(Stereo Decoder)
Demod.
Inp. Sel.
A/D
ASCRI
ASCLI_ASCI
ARO
ALO
1801
18,432MHz
7600
6600 7V5
7004-A
A-VCC
MUTE
Serial-Bus Control
REC
PB
mute
LA71527M
(Linear-Aud. Proc.)
A-GND
HD SW
3628
3638
PB Level
7603
7607
Erase Osc.
BIAS 3630
Tape Deck
AEH1 TD1-3
AEH2 TD1-4
MEH1 TD2-2
MEH2 TD2-1
ARH TD1-7
APH TD1-5
AUDIO ERASE HEAD
MAIN ERASE HEAD
REC/PB HEAD
7602 7604 7605
Linear Audio (AL) Recorder Unit Board (RUBAD)
DELTA_IO.dwg
HS_Z990422

TUNER 2 AND VIDEO PROCESSING - BLOCK DIAGRAM


SECAM PROCESSING (VSEC) Recorder Unit Board (RUBAD)
7072 LA7339
SECAM Processing
5SE
VCC
5AS2(PS)
5072
2079
CSI(AI01)
CSYNC
PBV(AI01)
HF-CLOCHE/ ANTICLOCHE
4,3MHz
MUTE
CSP
Sync Gate
:4
Sync Gate
LF-CLOCHE/ ANTICLOCHE
1,1MHz
Sync Gate Generator
Rec Mute
x2
2,2MHz
4,3V Reg.
4,3MHz VCO
REC/ PB
1,1MHz VCO
VREC
3,3MHz Adj.
3089
FSC
7071
7000
Sec. Curr.
3086
REC
PB
VIDEO SIGNAL ELECTRONICS (VS) Recorder Unit Board (RUBAD)
SCL2(AI01)
SDA2(AI01)
5VS1
5VS2
7004 LA71527M
(Y/C Processing)
CONTROL
NTSC
FFP(AI01)
VPDC(IO_1,CVB)
1963-3
OS(AI02)
for AV-Cinch
7505
7503
7501
VRUB(IO_1)
1963-9
VP
QV/QH INS
INV
COMB FILTER
7002
CLK
4,43MHz
VXO1
SUB CONV
VCO
CROT
ACC
MAIN CONV
KILL
BPF1
BPF2
SUB
FM DEMOD
φ
Chr.
CSYNC(AI01)
CSYNC2(HA)
3017
SYNC SEP
YC MIX
PIC CTL
DEEMPH DHP NC
1907-1
VFC(HPAV)
VSCIN(IO_1)
VFV1_2(TU2)
YNR DOP
DETAIL ENH. PREEMPH
MOD
5AS2(PS)
5003
2051
5007
2057
GND
DE-EMPH
64µs
7003
CROT(AI01)
CSCP(AI01)
CKDET(AI01)
72
73
74
75
76
77
78
79
80
81
82
85
TUNER (TU2) Recorder Unit Board
2TU
RCLK_MNT2(AI02)
RWE_SB1_2(AI01)
5AS
5304
+5V
1301 UV1316
(Tuner)
P L L
SCL0
SDA0
AGC
45
6303
6304
3321
3322
7307
7308
1305
4303
6301
7304
3316
1302
4302
6300
7302
40,4MHz Adj.
3306
5301
1300
2320
2312
3301
5300 AFC2
SIF AGC
INTERCARRIER MIXER
AM DEMOD
7309
TDA981xT
(Demodulator)
TRAVELING WAVE DIVIDER
VCO
3 - stage IF-amplifier
FREQUENCY DETECTOR ANS PHASE DETECTOR
VIDEO DEMODULATOR
Tuner & VIF - AGC
AGC2
RDATA_PSS2(AI02)
SCL0 (AI01)
SDA0 (AI01)
33A (PS)
5DS
5DS (PS)
5AS (PS)
to/from AF,AF2,AL,COTV,DOSCD,HPAV,IO_1,LS,PS,PT,SED,TV1,TV

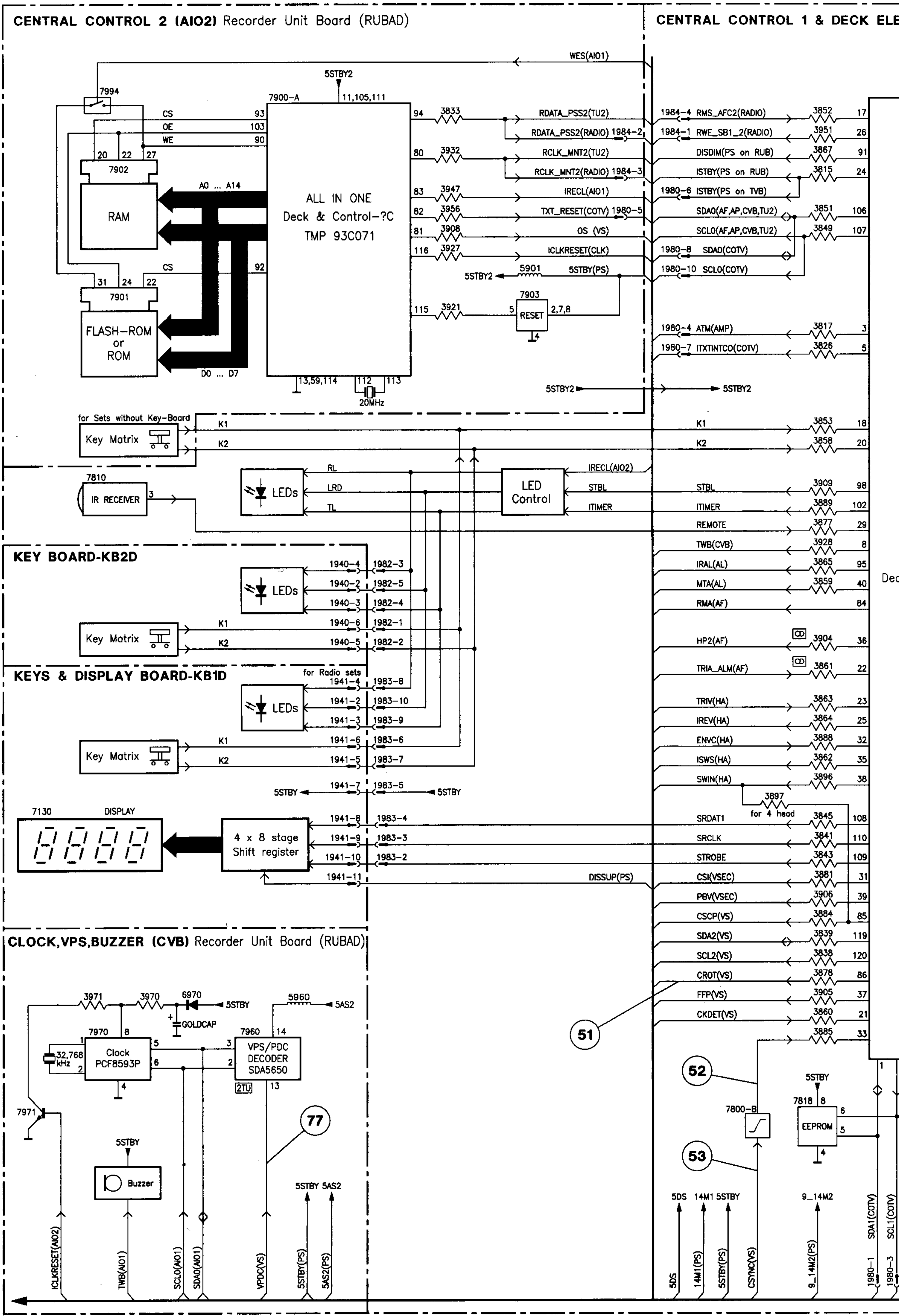
✱ for variants see variant list on page 3-36


HEAD AMPFLIFIER (HA) Recorder Unit Board (RUBAD)
7073
CRSV
FMPV
7103
ENVC(AI01)
SWIN(AI01)
5AS2(PS)
5100
IREV(AI01)
7102
FMPV
CSYNC2(VS)
TRIV(AI01)
7100
ISWS(AI01)
2107
CSRV
3100
CPRV
3102
FMRV
3106
STV5742/2-HEAD 7104
STV5744/4-HEAD 7105
CAGC REC
REC IN
TRIV
CSYN
GND2
YCBP SWR
VCC
SWIN
NC
ENVC
I_OUT LP
PB
REC
I_OUT SP
SP/LP
H1
H2
(Video-Amplifier)
VCC
89
7106
Rec. Curr. Switch
3111
2118
88
SP I_OUT
SP V1
SP V2
LP H2
SP H2
GND1
SP H1
LP H1
LP V2
LP V1
I_OUT
V1
V2
C1
H2
GND1
H1
C2
CPRV
69
FMPV
70
7013
EF
FMRV
71
AH2(AF)
AHC(AF)
AH1(AF)
1912 (2 Head)
1911 (4 Head)
LH1
LHC VH1'
LH2 VH1'C
SH2 VH2
SHC VHC
SH1 VH1
HEAD-DISC
ROTATING TRANS-FORMER
AH1
AHC
AH2
1912-1
1912-2
1912-3
RWE_SB1_2(AI01)
5AS2
7300
5305
Audio
Sound_IF
FM PLL DEMODE
VIDEO AMPLIFIER
AFC
AFV2
3310
1306
1307
4307
7301-C
SIF2
9301
1304
7301-B
7305
EF
5DS
3305
3309
46
7014
EF
RMS_AFC2(AI01)
RCLK_MNT2(AI02)
VFV1_2(IO_1)
VFV1_2(VS)
1963-1
DELTA_VS.dwg
HSZ_990422
SOUND PROCESSING (AP) Recorder Unit Board (RUBAD)
8A
5DS
5AS
7670
MSP3415D
(Stereo Decoder)
Demod.
Digital Feature Processing
Inp. Sel.
A/D
D/A
D/A
Out. Sel.
25,29,35
1670
18,432MHz
8A
3674
3675
6671 4V7
6672 3V3
12A(PS)
5DS(PS)
5AS(PS)
AFEL(AF)
AFER(AF)
SCL0(AI01)
SDA0(AI01)

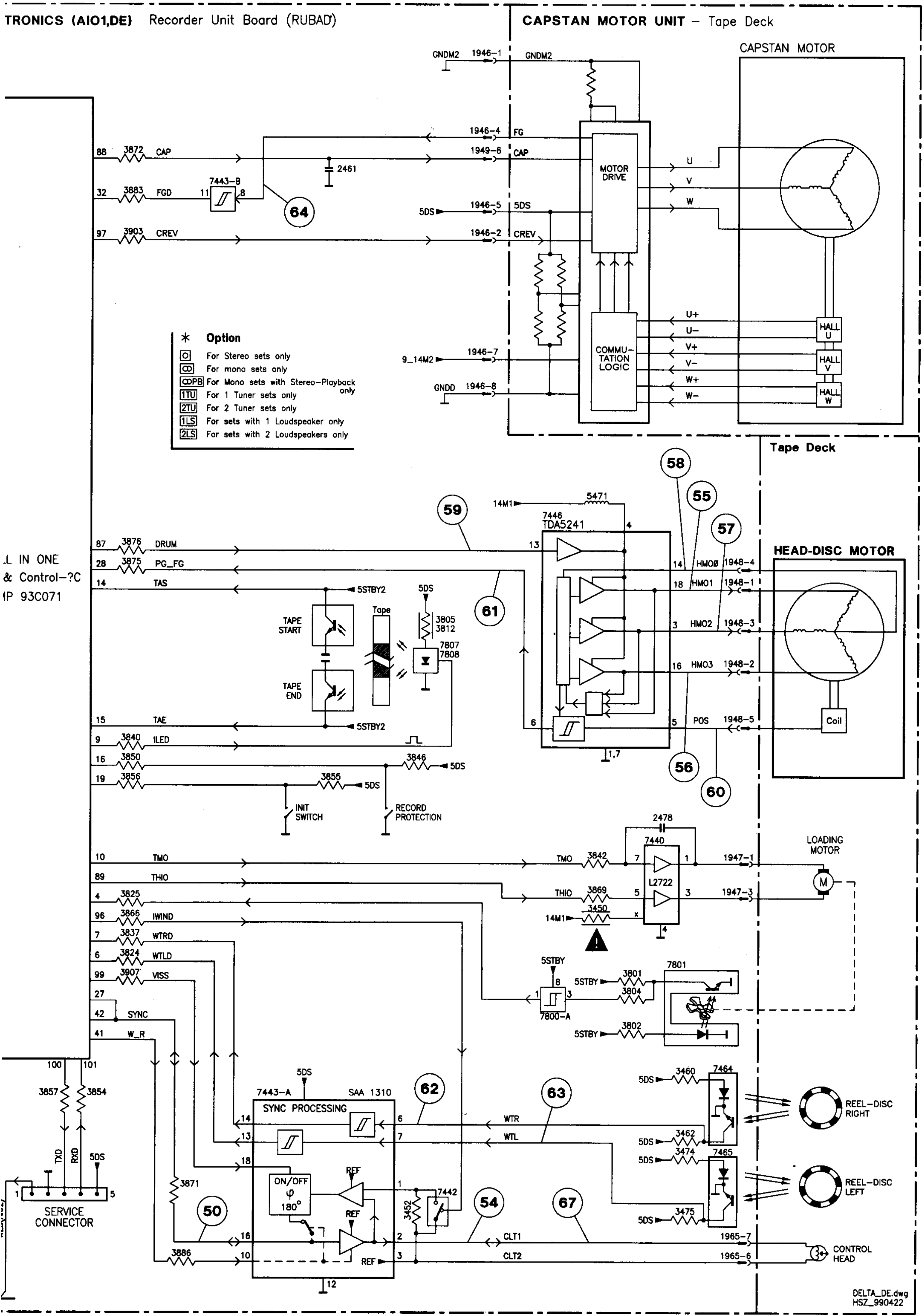
✳ **Option**

O	For Stereo sets only
ꝏ	For mono sets only
ꝏPB	For Mono sets with Stereo-Playback only
1TU	For 1 Tuner sets only
2TU	For 2 Tuner sets only
1LS	For sets with 1 Loudspeaker only
2LS	For sets with 2 Loudspeakers only

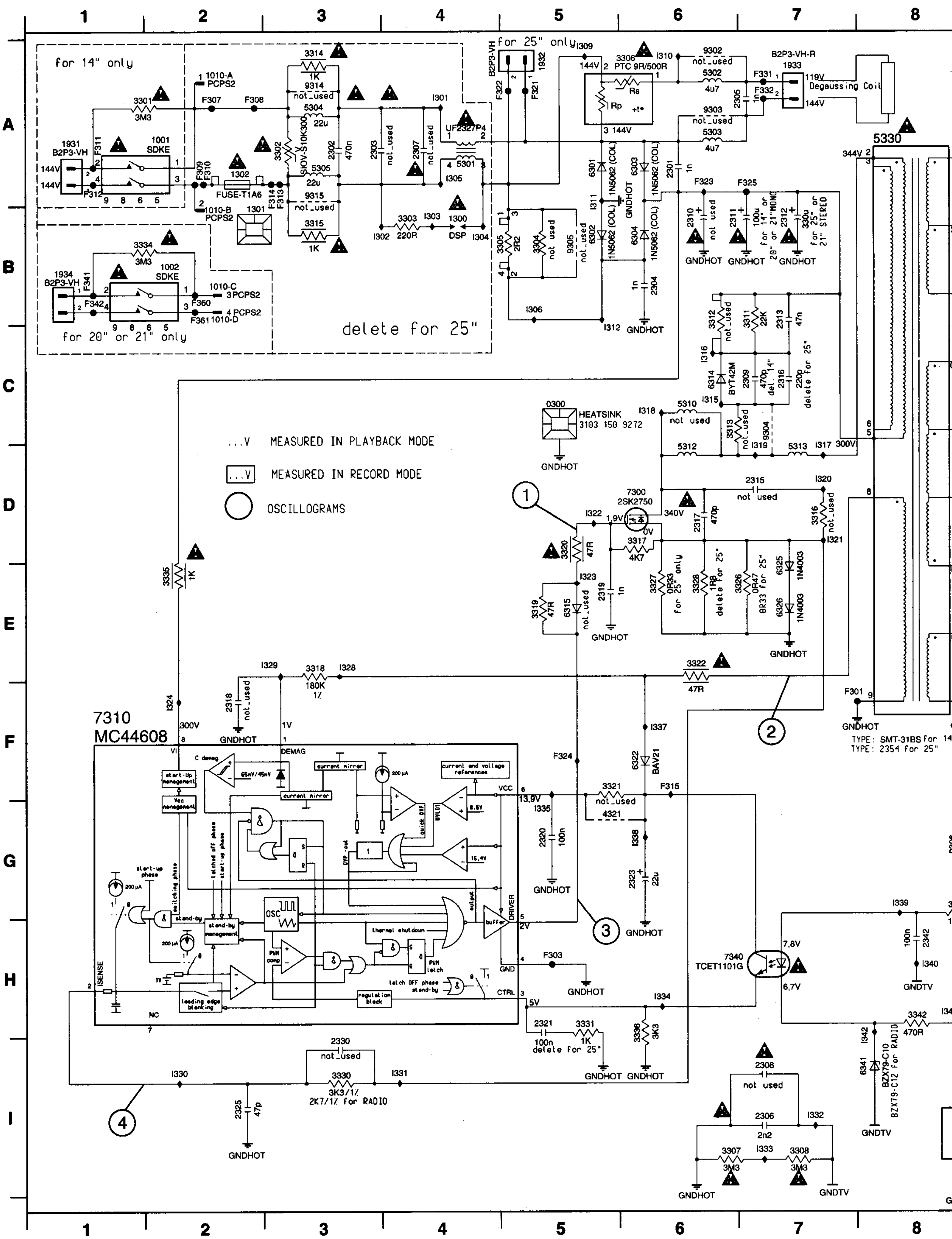
CENTRAL CONTROL AND DECK ELECTRONICS - BLOCK I


CENTRAL CONTROL 2 (AIO2) Recorder Unit Board (RUBAD)
CENTRAL CONTROL 1 & DECK ELE
WES(AIO1)
5STBY2
7994
7900–A
11,105,111
CS
OE
WE
93
103
90
20
22
27
7902
RAM
A0 ... A14
ALL IN ONE
Deck & Control–?C
TMP 93C071
CS
92
31
24
22
7901
FLASH–ROM
or
ROM
D0 ... D7
13,59,114
112
113
20MHz
94
3833
RDATA_PSS2(TU2)
RDATA_PSS2(RADIO) 1984–2
80
3932
RCLK_MNT2(TU2)
RCLK_MNT2(RADIO) 1984–3
83
3947
IRECL(AIO1)
82
3956
TXT_RESET(COTV) 1980–5
81
3908
OS (VS)
116
3927
ICLKRESET(CLK)
5STBY2
5901
5STBY(PS)
7903
115
3921
5
RESET
2,7,8
4
5STBY2
5STBY2
1984–4 RMS_AFC2(RADIO) 3852 17
1984–1 RWE_SB1_2(RADIO) 3951 26
DISDIM(PS on RUB) 3867 91
ISTBY(PS on RUB) 3815 24
1980–6 ISTBY(PS on TVB)
SDA0(AF,AP,CVB,TU2) 3851 106
SCL0(AF,AP,CVB,TU2) 3849 107
1980–8 SDA0(COTV)
1980–10 SCL0(COTV)
1980–4 ATM(AMP) 3817 3
1980–7 ITXTINTCO(COTV) 3826 5
for Sets without Key–Board
Key Matrix
K1
K2
K1 3853 18
K2 3858 20
7810
IR RECEIVER
3
LEDs
RL
LRD
TL
LED
Control
IRECL(AIO2)
STBL
ITIMER
STBL 3909 98
ITIMER 3889 102
REMOTE 3877 29
TWB(CVB) 3928 8
IRAL(AL) 3865 95
MTA(AL) 3859 40
RMA(AF) 84
HP2(AF) 3904 36
TRIA_ALM(AF) 3861 22
Dec
KEY BOARD–KB2D
1940–4 1982–3
1940–2 1982–5
1940–3 1982–4
1940–6 1982–1
1940–5 1982–2
LEDs
Key Matrix
K1
K2
KEYS & DISPLAY BOARD–KB1D
for Radio sets
1941–4 1983–8
1941–2 1983–10
1941–3 1983–9
1941–6 1983–6
1941–5 1983–7
LEDs
Key Matrix
K1
K2
5STBY
1941–7 1983–5
5STBY
7130
DISPLAY
4 x 8 stage
Shift register
1941–8 1983–4
1941–9 1983–3
1941–10 1983–2
1941–11
DISSUP(PS)
TRIV(HA) 3863 23
IREV(HA) 3864 25
ENVC(HA) 3888 32
ISWS(HA) 3862 35
SWIN(HA) 3896 38
3897
for 4 head
SRDAT1 3845 108
SRCLK 3841 110
STROBE 3843 109
CSI(VSEC) 3881 31
PBV(VSEC) 3906 39
CSCP(VS) 3884 85
SDA2(VS) 3839 119
SCL2(VS) 3838 120
CROT(VS) 3878 86
FFP(VS) 3905 37
CKDET(VS) 3860 21
3885 33
51
52
53
CLOCK,VPS,BUZZER (CVB) Recorder Unit Board (RUBAD)
3971
3970
6970
5STBY
GOLDCAP
5960
5AS2
7970
1
8
32,768 kHz
2
Clock
PCF8593P
5
6
4
7960
14
3
2
VPS/PDC
DECODER
SDA5650
2TU
13
7971
77
5STBY
Buzzer
5STBY 5AS2
ICLKRESET(AIO2)
TWB(AIO1)
SCL0(AIO1)
SDA0(AIO1)
VPDC(VS)
5STBY(PS)
5AS2(PS)
7800–B
5STBY
7818
8
6
5
EEPROM
4
1
5DS 14M1 5STBY
9_14M2
5DS
14M1(PS)
5STBY(PS)
CSYNC(VS)
9_14M2(PS)
SDA1(COTV)
SCL1(COTV)
1980–1
1980–3

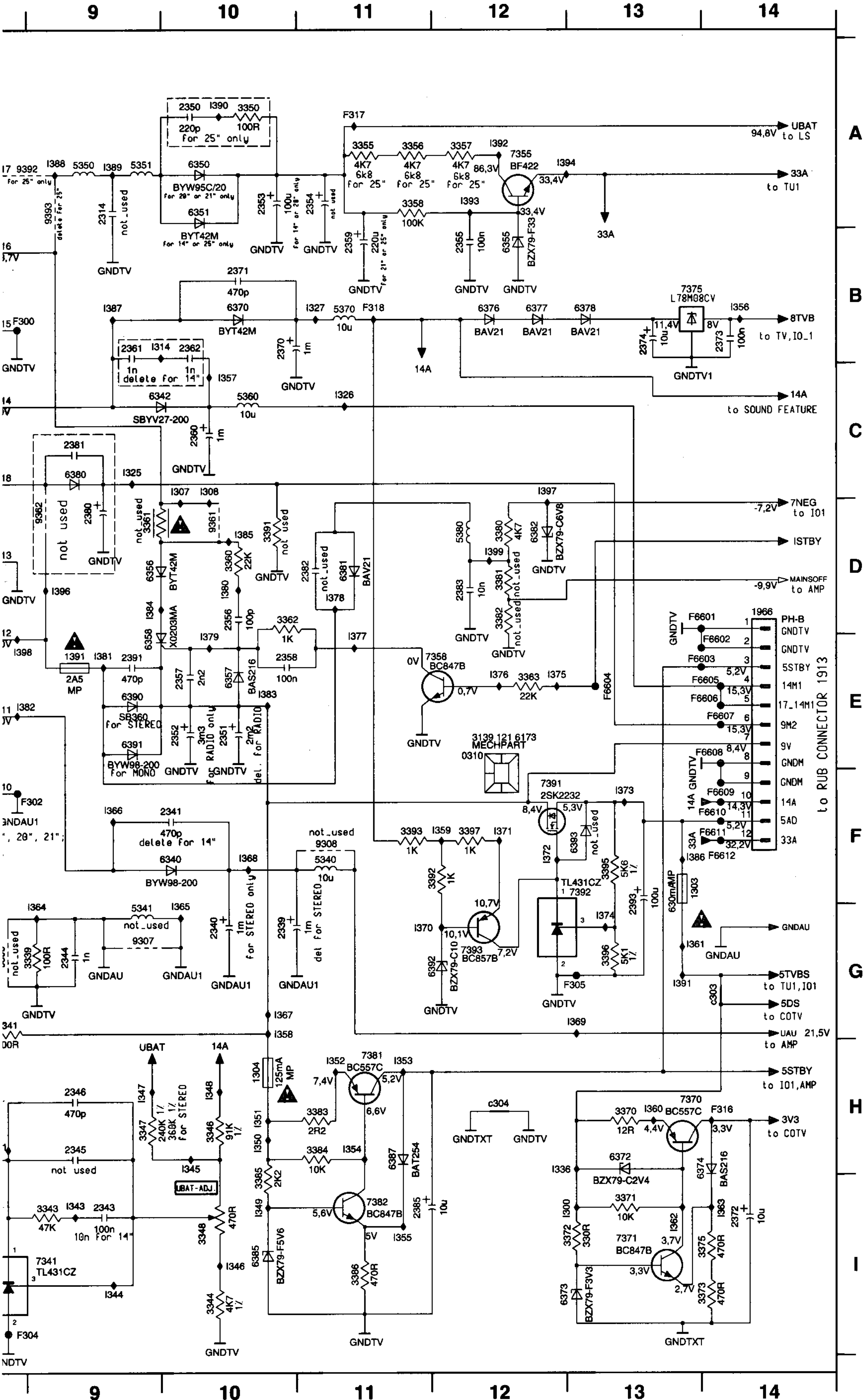
IAGRAM


TRONICS (AIO1,DE) Recorder Unit Board (RUBAD)
CAPSTAN MOTOR UNIT – Tape Deck
CAPSTAN MOTOR
GNDM2
1946-1
1946-4 FG
1949-6 CAP
1946-5 5DS
1946-2 CREV
1946-7
1946-8
9_14M2
GNDD
88 3872 CAP
32 3883 FGD
97 3903 CREV
7443-B
2461
64
MOTOR DRIVE
COMMU-TATION LOGIC
U
V
W
U+
U-
V+
V-
W+
W-
HALL U
HALL V
HALL W
* Option
For Stereo sets only
For mono sets only
For Mono sets with Stereo-Playback only
1TU For 1 Tuner sets only
2TU For 2 Tuner sets only
1LS For sets with 1 Loudspeaker only
2LS For sets with 2 Loudspeakers only
Tape Deck
HEAD-DISC MOTOR
.L IN ONE
& Control-?C
IP 93C071
14M1
5471
7446
TDA5241
58
55
57
59
61
56
60
87 3876 DRUM
28 3875 PG_FG
14 TAS
15 TAE
9 3840 ILED
16 3850
19 3856
3846
3855
5STBY2
5DS
TAPE START
TAPE END
Tape
3805
3812
7807
7808
INIT SWITCH
RECORD PROTECTION
HM0Ø
HM01
HM02
HM03
POS
1948-4
1948-1
1948-3
1948-2
1948-5
Coil
2478
7440
L2722
LOADING MOTOR
M
10 TMO
89 THIO
4 3825
96 3866 IWIND
7 3837 WTRD
6 3824 WTLD
99 3907 VISS
27
42 SYNC
41 W_R
TMO 3842
THIO 3869
3450
1947-1
1947-3
5STBY
7800-A
7801
3801
3804
3802
100
101
3857
3854
TXD
RXD
SERVICE CONNECTOR
7443-A
SAA 1310
SYNC PROCESSING
ON/OFF φ 180°
REF
62
63
50
54
67
3871
3886
3452
7442
WTR
WTL
CLT1
CLT2
1965-7
1965-6
CONTROL HEAD
3460
7464
3462
3474
7465
3475
REEL-DISC RIGHT
REEL-DISC LEFT
DELTA_DE.dwg
HSZ_990422

Power Supply (PS) - TV Board (TVBAD)

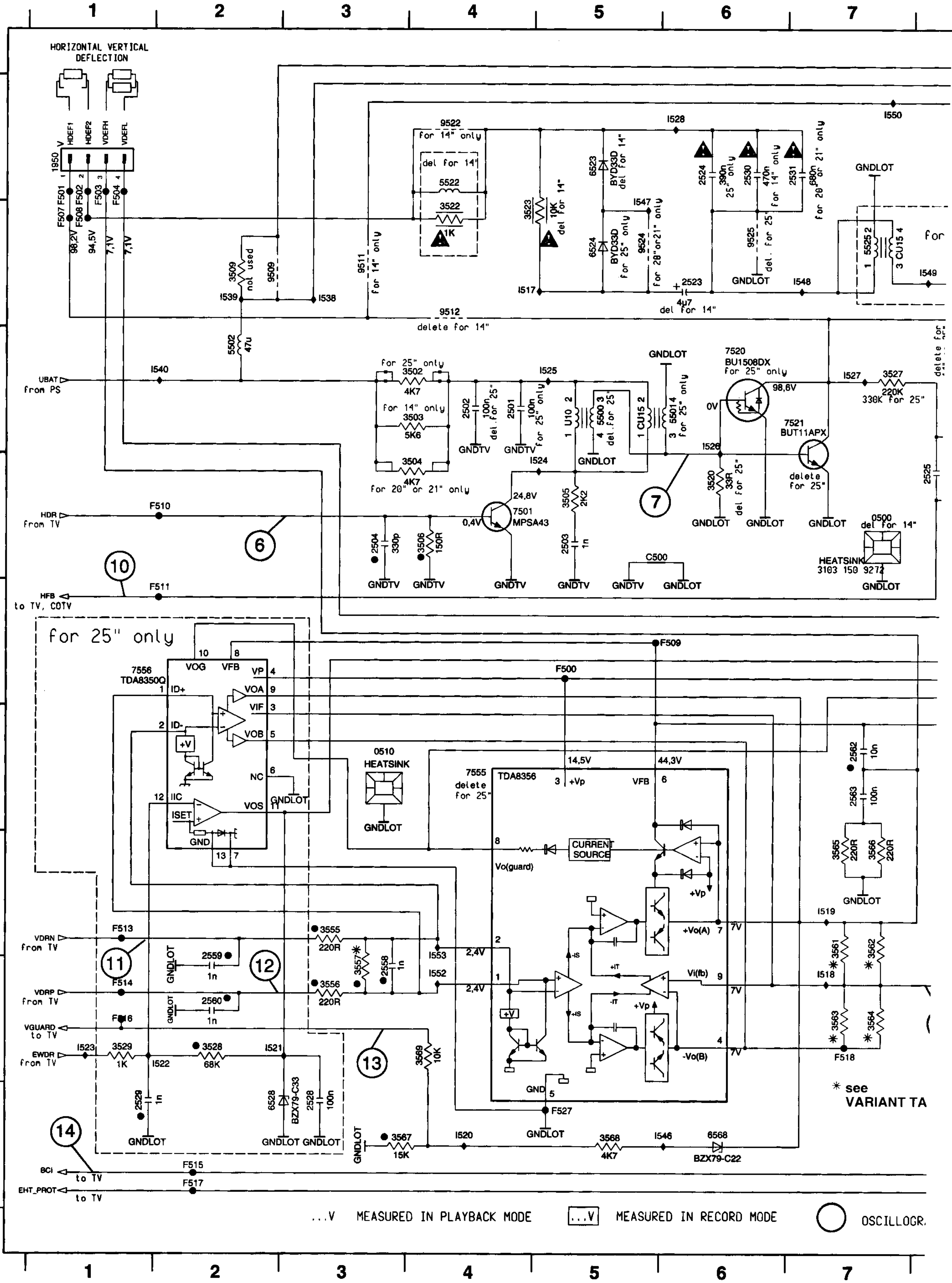

1 2 3 4 5 6 7 8
A B C D E F G H I
for 14" only
for 20" or 21" only
delete for 25"
for 25" only
1931 B2P3-VH
1001 SDKE
1934 B2P3-VH
1002 SDKE
1302 FUSE-T1A6
1301
3302 SIOV-S10K300
5301 UF2327P4
3306 PTC 9R/500R
B2P3-VH-R 1933
Degaussing Coil
5330
344V
300V
0300 HEATSINK 3103 150 9272
...V MEASURED IN PLAYBACK MODE
...V MEASURED IN RECORD MODE
OSCILLOGRAMS
7300 2SK2750
340V
1,9V
0V
7310 MC44608
300V
1V
13,9V
2V
5V
start-up management
Vcc management
current mirror
current and voltage references
stand-by management
OSC
PWM latch
buffer
thermal shutdown
leading edge blanking
regulation block
VCC
DRIVER
GND
CTRL
ISENSE
DEMAG
NC
7340 TCET1101G
7,8V
6,7V
GNDHOT
GNDTV
TYPE: SMT-31BS for 14
TYPE: 2354 for 25"
2K7/1% for RADIO
BZX79-C10 BZX79-C12 for RADIO
① ② ③ ④

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

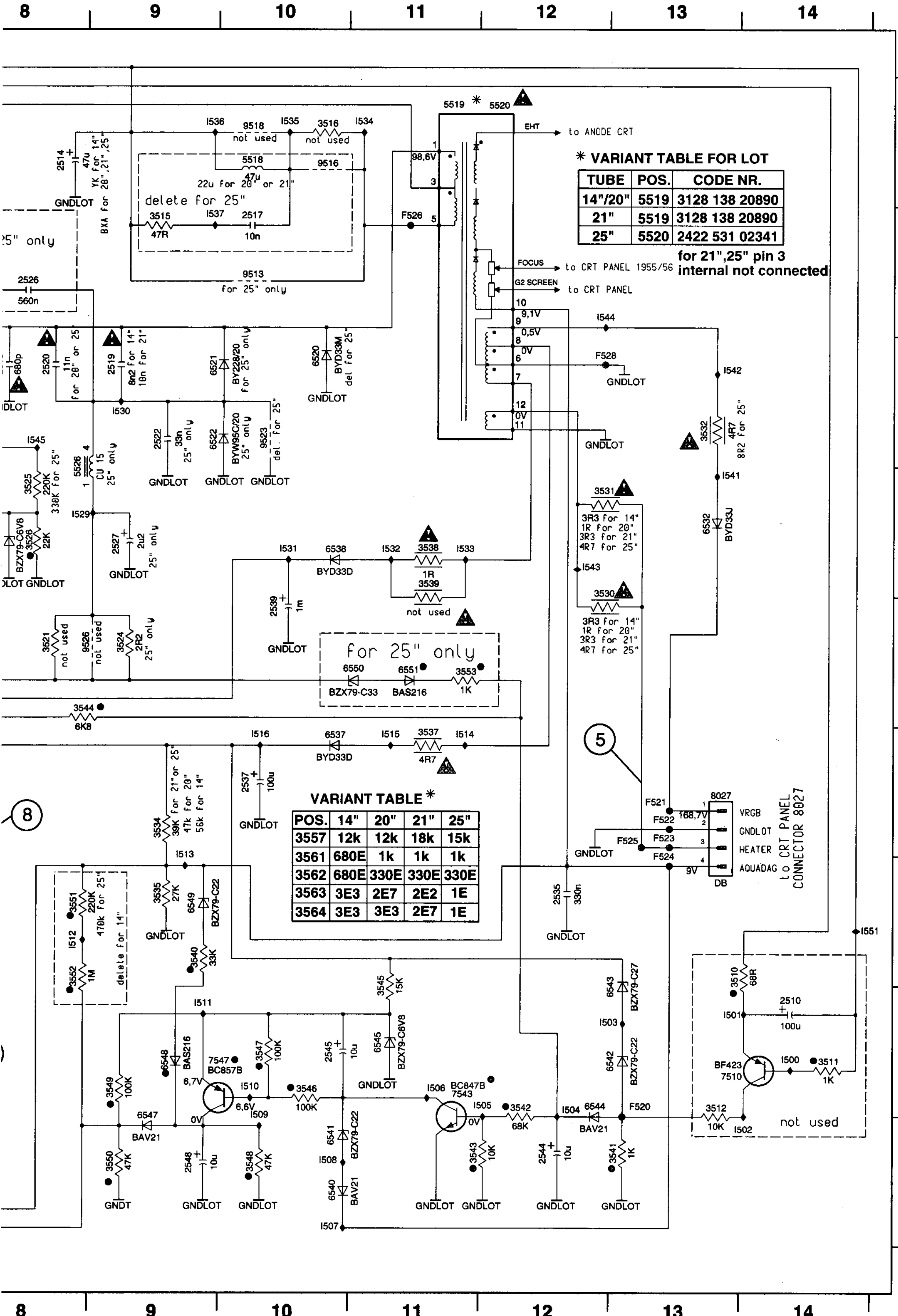

9
10
11
12
13
14
A
B
C
D
E
F
G
H
I
UBAT to LS
94,8V
33A to TU1
33A
8TVB to TV,IO_1
14A to SOUND FEATURE
14A
7NEG to IO1
-7,2V
ISTBY
MAINSOFF to AMP
-9,9V
2350 220p I390 3350 100R for 25" only
5350 5351 6350 BYW95C/20 6351 BYT42M
2314 not_used
2353 100u 2354 not used
3355 4K7 6k8 for 25"
3356 4K7 6k8 for 25"
3357 4K7 6k8 for 25"
7355 BF422
86,3V 33,4V
3358 100K
2359 220u
2355 100n
6355 BZX79-F33
GNDTV
2371 470p
6370 BYT42M
5370 10u
F317
F318
6376 BAV21 6377 BAV21 6378 BAV21
7375 L78M08CV
11,4V 8V
2374 10u 2373 100n
GNDTV1
2370 1m
2361 1n I314 2362 1n delete for 14"
6342 SBYV27-200
5360 10u
2360 1m
2381 6380 9362 not used 2380
3361 not_used 9361
6356 BYT42M
6358 X0203MA
3360 22K
2356 100p
3391 not used
2382 not_used 6381 BAV21
5380
3380 4K7
6382 BZX79-C6V8
2383 10n
3381 not_used
3382 not_used
3362 1K
2358 100n
1391 2A5 MP
2391 470p
6390 SB360 for STEREO
6391 BYW98-200 for MONO
2357 2n2
6357 BAS216
2352 3m3 RADIO only
2351 2m2 del. for RADIO
7358 BC847B
0V 0,7V
3363 22K
F6604
3139 121 6173 MECHPART 0310
7391 2SK2232
8,4V 5,3V
6393 not_used
3393 1K 3397 1K
3392 1K
7393 BC857B
10,7V 10,1V 7,2V
6392 BZX79-C10
TL431CZ 7392
3395 5K6 1%
2393 100u
3396 5K1 1%
F305
1966 PH-B
GNDTV GNDTV 5STBY 14M1 17_14M1 9M2 9V GNDM GNDM 14A 5AD 33A
5,2V 15,3V 15,3V 8,4V 14,3V 5,2V 32,2V
to RUB CONNECTOR 1913
F6601 F6602 F6603 F6605 F6606 F6607 F6608 F6609 F6610 F6611 F6612
1303 630mA MP
GNDAU
5TVBS to TU1,IO1
5DS to COTV
UAU 21,5V to AMP
5STBY to IO1,AMP
3V3 to COTV
2341 470p delete for 14"
6340 BYW98-200
9308 not_used 5340 10u
2340 1m for STEREO only
2339 1m del for STEREO
5341 not_used 9307
3339 100R
2344 1n
GNDAU1
1304 125mA MP
7381 BC557C
7,4V 5,2V 6,6V
3383 2R2
3384 10K
3385 2K2
7382 BC847B
5,6V 5V
6387 BAT254
2385 10u
6385 BZX79-F5V6
3386 470R
UBAT
14A
2346 470p
2345 not used
3347 240K 1% 368K 1% for STEREO
3346 91K 1%
UBAT-ADJ.
3343 47K 2343 100n 10n for 14"
3348 470R
7341 TL431CZ
3344 4K7 1%
F304
c304
GNDTXT
7370 BC557C
3370 12R
4,4V 3,3V
F316
6372 BZX79-C2V4
6374 BAS216
3371 10K
3372 330R
7371 BC847B
3,7V 3,3V 2,7V
6373 BZX79-F3V3
3375 470R
3373 470R
2372 10u

0300	C5
0310	E12
1001	A2
1002	B2
1010-A	A2
1010-B	A2
1010-C	B2
1010-D	B2
1300	B4
1301	A2
1302	B2
1303	F13
1304	H10
1391	E9
1931	A1
1932	A5
1933	A7
1934	B1
1966	D14
2301	A6
2302	A3
2303	A3
2304	B6
2305	A7
2306	I7
2307	A4
2308	I7
2309	C7
2310	B6
2311	B6
2312	B7
2313	B7
2314	A9
2315	D7
2316	C7
2317	D6
2318	F2
2319	E5
2320	G5
2321	H5
2323	G6
2325	I2
2330	I3
2339	G10
2340	G10
2341	F10
2342	H8
2343	I9
2344	G9
2345	H9
2346	H9
2350	A10
2351	E10
2352	E10
2353	A10
2354	A11
2355	B12
2356	D10
2357	E10
2358	E10
2359	B11
2360	C10
2361	B9
2362	B10
2370	B10
2371	B10
2372	I14
2373	B14
2374	B13
2380	D9
2381	C9
2382	D11
2383	D12
2385	I11
2391	E9
2393	G13
3301	A1
3302	A3
3303	B4
3304	B5
3305	B5
3306	A5
3307	I6
3308	I7
3311	B7
3312	B6
3313	C6
3314	A3
3315	B3
3316	D7
3317	D6
3318	E3
3319	E5
3320	D5
3321	F5
3322	E6
3326	E7
3327	E6
3328	E6
3330	I3
3331	H5
3334	B1
3335	E2
3336	H6
3339	G9
3341	G8
3342	H8
3343	I9
3344	I10
3346	H10
3347	H9
3348	I10
3350	A10
3355	A11
3356	A11
3357	A12
3358	A11
3360	D10
3361	D9
3362	D10
3363	E12
3370	H13
3371	I13
3372	I13
3373	I14
3375	I14
3380	D12
3381	D12
3382	D12
3383	H11
3384	H11
3385	I10
3386	I11
3391	D10
3392	F12
3393	F11
3395	F13
3396	G13
3397	F12
4321	G5
5301	A4
5302	A6
5303	A6
5304	A3
5305	A3
5310	C6
5312	D6
5313	D7
5330	A8
5340	F11
5341	G9
5350	A9
5351	A9
5360	C10
5370	B11
5380	D12
6301	A5
6302	B5
6303	A6
6304	B6
6314	C6
6315	E5
6322	F6
6325	E7
6326	E7
6340	F10
6341	I8
6342	C9
6350	A10
6351	A10
6355	B12
6356	D9
6357	E10
6358	E9
6370	B10
6372	H13
6373	I12
6374	H14
6376	B12
6377	B12
6378	B13
6380	C9
6381	D11
6382	D12
6385	I10
6387	H11
6390	E9
6391	E9
6392	G12
6393	F13
7300	D6
7310	F1
7340	H7
7341	I9
7355	A12
7358	E12
7370	H13
7371	I13
7375	B13
7381	H11
7382	I11
7391	F12
7392	F13
7393	G12
9302	A6
9303	A6
9304	C7
9305	B5
9306	G8
9307	G9
9308	F11
9314	A3
9315	A3
9361	D10
9362	D9
9392	A9
9393	A9
F300	B8
F301	F7
F302	F9
F303	H5
F304	I8
F305	G13
F307	A2
F308	A2
F309	A2
F310	A2
F311	A1
F312	A1
F313	A3
F314	A3
F315	F6
F316	H14
F317	A11
F318	B11
F321	A5
F322	A5
F323	A6
F324	F5
F325	A7
F331	A7
F332	A7
F341	B1
F342	B1
F360	B2
F361	B2
F6601	D14
F6602	E14
F6603	E13
F6604	E13
F6605	E14
F6606	E14
F6607	E14
F6608	E14
F6609	F14
F6610	F14
F6611	F14
F6612	F14
I300	I12
I301	A4
I302	B3
I303	B4
I304	B4
I305	A4
I306	B5
I307	C10
I308	C10
I309	A5
I310	A6
I311	A5
I312	C5
I314	B9
I315	C6
I316	C6
I317	D7
I318	C6
I319	D7
I320	D7
I321	D7
I322	D5
I323	E5
I324	F2
I325	C9
I326	C11
I327	B11
I328	E3
I329	E3
I330	I2
I331	I4
I332	I7
I333	I7
I334	H6
I335	G5
I336	H12
I337	F6
I338	G6
I339	G8
I340	H8
I341	H8
I342	H8
I343	I9
I344	I9
I345	H10
I346	I10
I347	H9
I348	H10
I349	I10
I350	H10
I351	H10
I352	H11
I353	H11
I354	H11
I355	I11
I356	B14
I357	C10
I358	G10
I359	F12
I360	H13
I361	G13
I362	I13
I363	I14
I364	G9
I365	G10
I366	F9
I367	G10
I368	F10
I369	G13
I370	G11
I371	F12
I372	F12
I373	F13
I374	G13
I375	E12
I376	E12
I377	E11
I378	D11
I379	E10
I380	D10
I381	E9
I382	E8
I383	E10
I384	D9
I385	D10
I386	F13
I387	B9
I388	A9
I389	A9
I390	A10
I391	G13
I392	A12
I393	A12
I394	A12
I396	D9
I397	C12
I398	E8
I399	D12
c303	G14
c304	H12

Deflection (LS) - TV Board (TVBAD)


HORIZONTAL VERTICAL DEFLECTION
1950
HDEF1
HDEF2
VDEFH
VDEFL
F507 F501
F508 F502
F503
F504
98,2V
94,5V
7,1V
7,1V
9522
for 14" only
del for 14"
5522
3522
1K
3523
10K
del for 14"
6523
BYD33D
del for 14"
1547
6524
BYD33D
for 25" only
9524
for 28" or 21" only
1528
2524
390n
25" only
2530
470n
for 14" only
2531
680n
for 20" or 21" only
1550
GNDLOT
9525
del. for 25"
5525
2
1
CU15
4
3
for
1549
1548
2523
4u7
del for 14"
1517
3509
not used
9509
1539
1538
9511
for 14" only
9512
delete for 14"
5502
47u
UBAT
from PS
1540
for 25" only
3502
4K7
for 14" only
3503
5K6
3504
4K7
for 20" or 21" only
1525
2502
100n
del. for 25"
2501
100n
for 25" only
GNDTV
U10
5500
del. for 25"
CU15
55014
for 25" only
GNDLOT
7520
BU1508DX
for 25" only
0V
98,6V
1527
3527
220K
330K for 25"
7521
BUT11APX
delete for 25"
1526
3520
33R
del for 25"
2525
delete for
1524
24,8V
7501
MPSA43
0,4V
3505
2K2
2503
1n
HDR
from TV
F510
2504
330p
3506
150R
C500
0500
del for 14"
HEATSINK
3103 150 9272
HFB
to TV, COTV
F511
for 25" only
7556
TDA8350Q
VOG
VFB
ID+
ID-
VP
VOA
VIF
VOB
NC
IIC
ISET
VOS
GND
+V
F509
F500
0510
HEATSINK
7555
delete for 25"
TDA8356
14,5V
44,3V
+Vp
VFB
CURRENT SOURCE
Vo(guard)
+Vo(A)
Vi(fb)
-Vo(B)
2,4V
7V
2562
10n
2563
100n
3565
220R
3566
220R
1519
1518
3561
3562
3563
3564
F518
* see VARIANT TA
VDRN
from TV
F513
2559
1n
3555
220R
3557
2558
1n
1553
1552
VDRP
from TV
F514
2560
1n
3556
220R
VGUARD
to TV
F516
EWDR
from TV
1523
3529
1K
1522
3528
68K
1521
3569
10K
2529
1n
6528
BZX79-C33
2528
100n
F527
3567
15K
1520
3568
4K7
1546
6568
BZX79-C22
BCI
to TV
F515
EHT_PROT
to TV
F517
...V MEASURED IN PLAYBACK MODE
...V MEASURED IN RECORD MODE
OSCILLOGR.
6
7
10
11
12
13
14
1
2
3
4
5
6
7
A
B
C
D
E
F
G
H
I

Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	


8
9
10
11
12
13
14
A
B
C
D
E
F
G
H
I
5519
5520
EHT
to ANODE CRT
FOCUS
to CRT PANEL 1955/56
G2 SCREEN
to CRT PANEL
98,6V
9,1V
0,5V
0V
1536
9518
not used
1535
3516
not used
1534
5518
47µ
22u for 20" or 21"
9516
delete for 25"
3515
47R
1537
2517
10n
F526
2514
47u
YK for 14"
YK for 20",21",25"
BXA for
GNDLOT
25" only
2526
560n
9513
for 25" only
10
9
8
6
7
12
11
1
3
5
1544
F528
1542
3532
4R7
8R2 for 25"
1541
6532
BYD33J
2520
11n
for 20" or 25"
2519
8n2 for 14"
10n for 21"
6521
BY228/20
for 25" only
6520
BYD33M
del for 25"
1530
2522
33n
25" only
6522
BYW95C/20
25" only
9523
del. for 25"
1545
3525
220K
330K for 25"
5526
CU 15
25" only
1529
2527
2u2
25" only
BZX79-C6V8
3526
22K
3531
3R3 for 14"
1R for 20"
3R3 for 21"
4R7 for 25"
1543
3530
1531
6538
BYD33D
1532
3538
1R
1533
3539
not used
2539
1m
3521
not used
9526
not used
3524
2R2
25" only
for 25" only
6550
BZX79-C33
6551
BAS216
3553
1K
3544
6K8
1516
6537
BYD33D
1515
3537
4R7
1514
2537
100u
3534
39K for 21" or 25"
47k for 20"
56k for 14"
1513
3535
27K
6549
BZX79-C22
3551
220K
470k for 25"
470k for 14"
1512
delete for 14"
3552
1M
3540
33K
3545
15K
6545
BZX79-C6V8
2545
10u
6543
BZX79-C27
1503
6542
BZX79-C22
1511
6548
BAS216
7547
BC857B
6,7V
3547
100K
1510
6,6V
1509
3546
100K
1506
BC847B
7543
1505
0V
3542
68K
1504
6544
BAV21
F520
3549
100K
6547
BAV21
0V
3550
47K
2548
10u
3548
47K
6541
BZX79-C22
1508
6540
BAV21
1507
3543
10K
2544
10u
3541
1K
GNDT
5
8
8027
F521
168,7V
F522
F523
F524
F525
9V
DB
VRGB
GNDLOT
HEATER
AQUADAG
to CRT PANEL CONNECTOR 8027
2535
330n
1551
3510
68R
1501
2510
100u
BF423
7510
1500
3511
1K
3512
10K
1502
not used

*** VARIANT TABLE FOR LOT**

TUBE	POS.	CODE NR.
14"/20"	5519	3128 138 20890
21"	5519	3128 138 20890
25"	5520	2422 531 02341

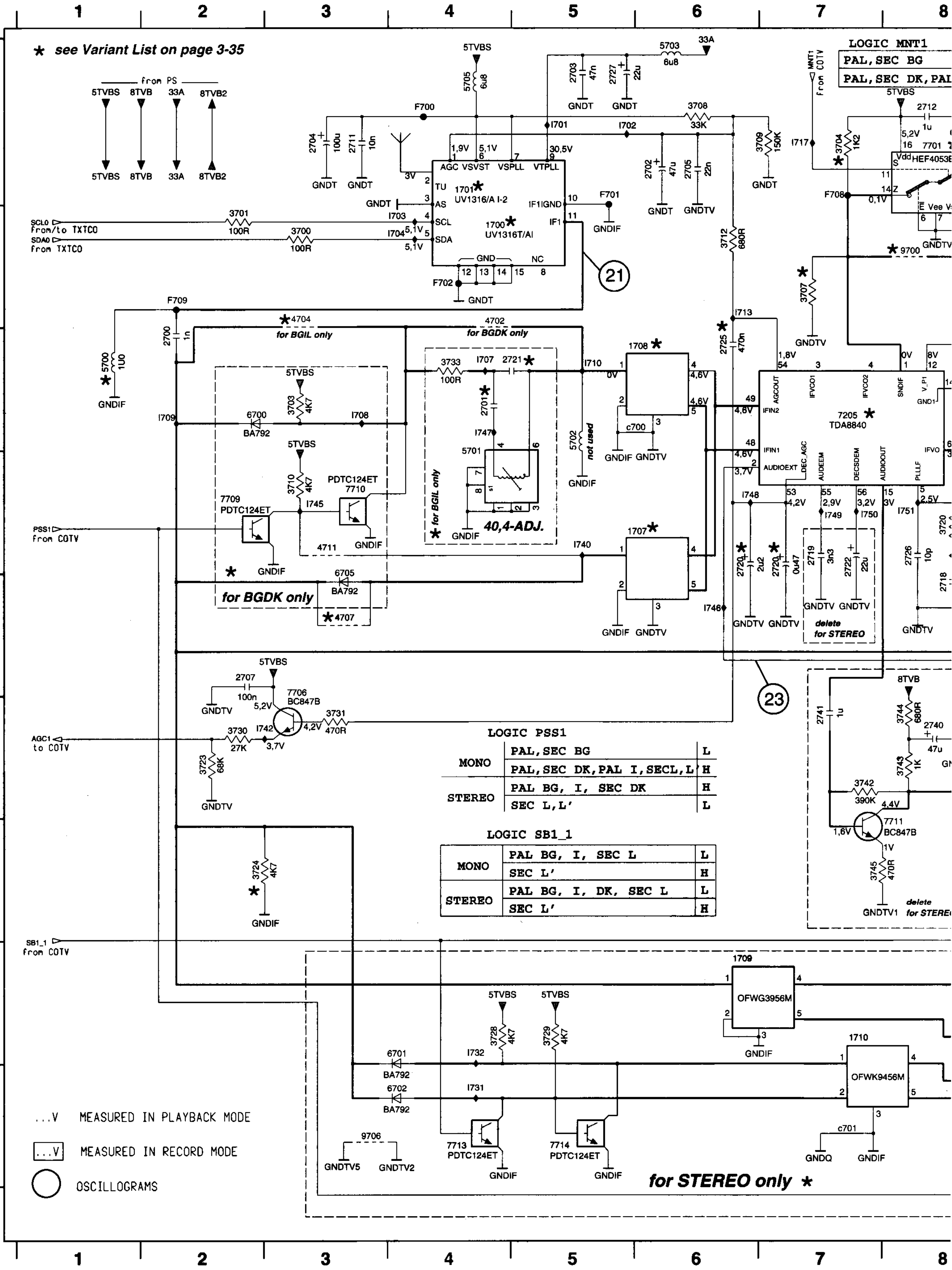
for 21",25" pin 3 internal not connected

VARIANT TABLE *

POS.	14"	20"	21"	25"
3557	12k	12k	18k	15k
3561	680E	1k	1k	1k
3562	680E	330E	330E	330E
3563	3E3	2E7	2E2	1E
3564	3E3	3E3	2E7	1E

0500	D7
0510	F3
1950	A1
2501	C4
2502	C4
2503	D5
2504	D3
2510	H14
2514	A8
2517	B10
2518	C8
2519	C9
2520	C8
2522	C9
2523	B6
2524	A6
2525	D8
2526	B8
2527	D9
2528	I3
2529	I1
2530	A6
2531	A7
2535	G12
2537	F10
2539	E10
2544	I12
2545	H10
2548	I9
2558	H3
2559	H2
2560	H2
2562	F7
2563	F7
3502	C4
3503	C4
3504	D4
3505	D5
3506	D4
3509	B2
3510	G13
3511	H14
3512	H13
3515	B9
3516	A10
3520	D6
3521	E8
3522	B4
3523	B4
3524	E9
3525	D8
3526	D8
3527	C7
3528	H2
3529	H1
3530	D12
3531	D12
3532	C13
3534	F9
3535	G9
3537	F11
3538	D11
3539	D11
3540	G9
3541	I13
3542	H12
3543	I11
3544	E8
3545	G11
3546	H10
3547	H10
3548	I10
3549	H9
3550	I9
3551	G8
3552	G8
3553	E11
3555	G3
3556	H3
3557	H3
3561	G7
3562	G7
3563	H7
3564	H7
3565	G7
3566	G7
3567	I3
3568	I5
3569	H4
5500	C5
5501	C6
5502	C2
5518	A10
5519	A11
5520	A12
5522	A4
5525	B7
5526	D8
6520	C10
6521	C9
6522	C9
6523	A5
6524	B5
6526	D8
6528	I2
6532	D13
6537	F10
6538	D10
6540	I10
6541	I10
6542	H13
6543	H13
6544	H12
6545	H11
6547	I9
6548	H9
6549	G9
6550	E11
6551	E11
6568	I6
7501	D4
7510	H14
7520	C6
7521	C7
7543	H11
7547	H10
7555	F4
7556	E1
8027	F13
9509	B2
9511	B3
9512	B4
9513	B10
9516	A10
9518	A10
9522	A4
9523	C10
9524	B5
9525	B6
9526	E9
C500	D5
F500	E5
F501	A1
F502	A1
F503	A1
F504	A1
F507	B1
F508	B1
F509	E6
F510	D2
F511	E2
F513	G1
F514	H1
F515	I2
F516	H1
F517	I2
F518	H7
F520	H13
F521	F13
F522	F13
F523	F13
F524	G13
F525	F13
F526	B11
F527	I5
F528	C12
I500	H14
I501	H13
I502	I14
I503	H12
I504	H12
I505	H12
I506	H11
I507	I10
I508	I10
I509	H10
I510	H10
I511	H9
I512	G8
I513	F9
I514	F11
I515	F11
I516	F10
I517	B4
I518	H7
I519	G7
I520	I4
I521	H2
I522	H2
I523	H1
I524	D5
I525	C5
I526	C6
I527	C7
I528	A6
I529	D8
I530	C9
I531	D10
I532	D11
I533	D11
I534	A11
I535	A10
I536	A9
I537	B9
I538	B3
I539	B2
I540	C2
I541	D13
I542	C13
I543	D12
I544	B12
I545	C8
I546	I6
I547	B5
I548	B7
I549	B8
I550	A7
I551	G14
I552	H4
I553	G4

Tuner 1 (TU1) - TV Board (TVBAD)


* see Variant List on page 3-35
from PS
5TVBS 8TVB 33A 8TVB2
SCL0 from/to TXTCO
SDA0 from TXTCO
PSS1 from COTV
AGC1 to COTV
SB1_1 from COTV
1701* UV1316/A I-2
1700* UV1316T/AI
AGC VSVST VSPLL VTPLL
TU AS SCL SDA
IF1IGND IF1
GND NC
F700 F701 F702 F709
3701 100R
3700 100R
5705 6u8
5703 6u8
3708 33K
3709 150K
3712 680R
2725 470n
*4704 for BGIL only
4702 for BGDK only
3733 100R
2721
2701
5701
for BGIL only
40,4-ADJ.
5702 not used
1708*
1707*
c700
6700 BA792
6705 BA792
3703 4K7
3710 4K7
7709 PDTC124ET
7710 PDTC124ET
for BGDK only
*4707
7205* TDA8840
IFIN2 IFIN1 AUDIOEXT DEC_AGC AUDEEM DECSDEM AUDIOOUT PLLIF IFVO AGCOUT IFVCO1 IFVCO2 SNDIF
2720 2u2
2720 0u47
2719 3n3
2722 22u
2726 10p
delete for STEREO
2707 100n
7706 BC847B
3730 27K
3731 470R
3723 68K
3724 4K7
LOGIC MNT1
PAL,SEC BG
PAL,SEC DK,PAL
MNT1 from COTV
3704 1K2
7701 HEF4053B
*9700
3707
2712 1u
8TVB
2741 1u
3744 680R
2740 47u
3743 1K
3742 390K
7711 BC847B
3745 470R
GNDTV1
delete for STEREO
1709 OFWG3956M
1710 OFWK9456M
c701
GNDQ
6701 BA792
6702 BA792
3728 4K7
3729 4K7
7713 PDTC124ET
7714 PDTC124ET
9706
GNDTV5 GNDTV2
for STEREO only *
GNDT GNDIF GNDTV
21
23
...V MEASURED IN PLAYBACK MODE
...V MEASURED IN RECORD MODE
OSCILLOGRAMS
1 2 3 4 5 6 7 8
A B C D E F G H I

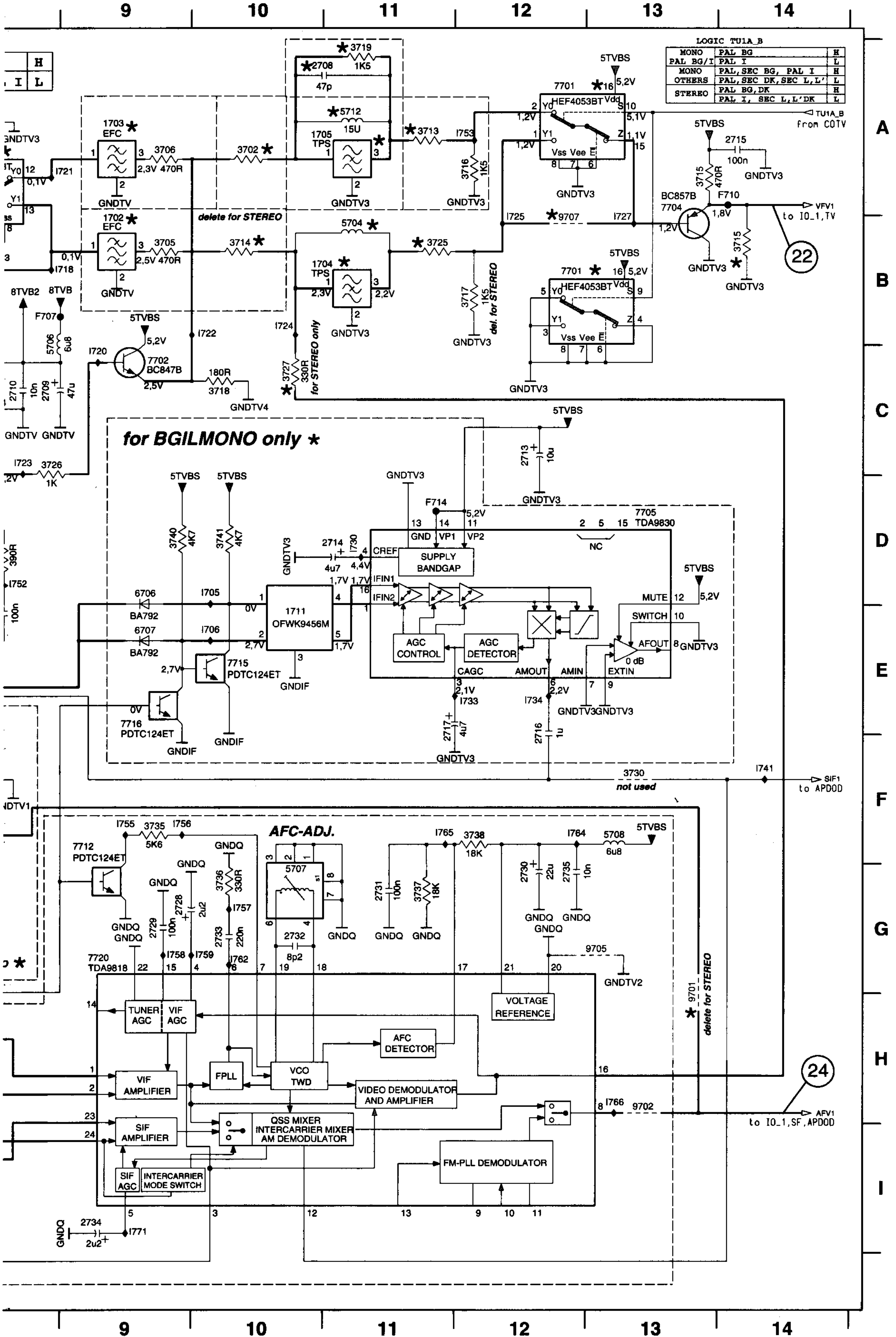
LOGIC PSS1

MONO	PAL,SEC BG	L
	PAL,SEC DK,PAL I,SECL,L'	H
STEREO	PAL BG, I, SEC DK	H
	SEC L,L'	L

LOGIC SB1_1

MONO	PAL BG, I, SEC L	L
	SEC L'	H
STEREO	PAL BG, I, DK, SEC L	L
	SEC L'	H

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

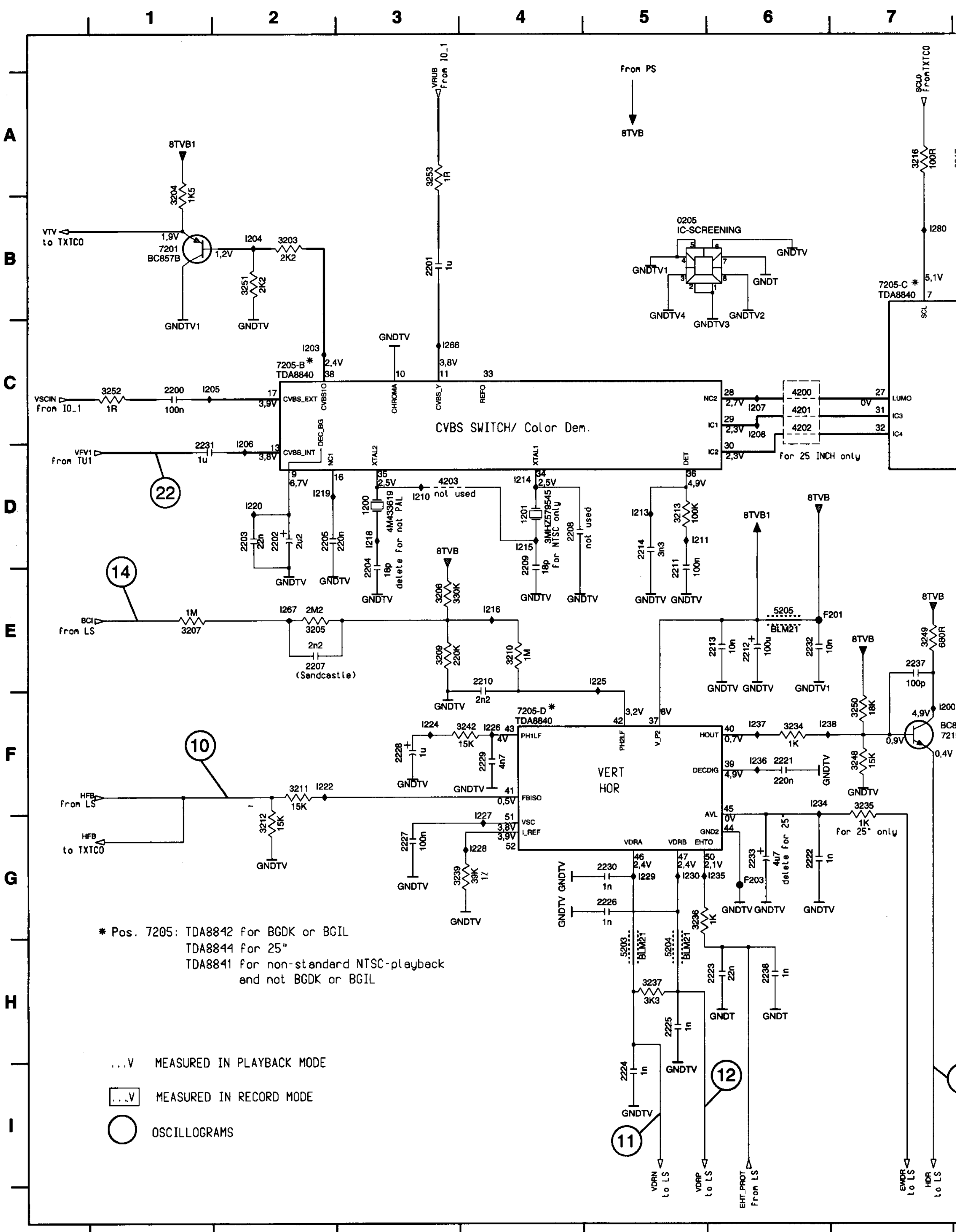

9
10
11
12
13
14
A
B
C
D
E
F
G
H
I
1703 EFC
1702 EFC
3706 470R
3705 470R
3702
3714
3719 1K5
2708 47p
5712 15U
1705 TPS
1704 TPS
5704
3713
3725
3716 1K5
3717 1K5
delete for STEREO
del. for STEREO
for STEREO only
7701 HEF4053BT
5TVBS
TU1A_B from COTV
7704 BC857B
3715 470R
2715 100n
F710
VFV1 to IO_1,TV
22
9707
7702 BC847B
3718 180R
5706 6u8
F707
8TVB2
8TVB
2710 10n
2709 47u
3727 330R
3726 1K
GNDTV3
GNDTV4
for BGILMONO only
7705 TDA9830
SUPPLY BANDGAP
AGC CONTROL
AGC DETECTOR
MUTE
SWITCH
AFOUT
0 dB
EXTIN
CAGC
AMOUT
AMIN
NC
1711 OFWK9456M
6706 BA792
6707 BA792
7715 PDTC124ET
7716 PDTC124ET
3740 4K7
3741 4K7
2714 4u7
2713 10u
2717 4u7
2716 1u
GNDIF
3730 not used
SIF1 to APDOD
AFC-ADJ.
7712 PDTC124ET
3735 5K6
3736 330R
2728 2u2
2729 100n
2733 220n
5707
2732 8p2
3738 18K
2731 100n
3737 18K
2730 22u
2735 10n
5708 6u8
GNDQ
9705
GNDTV2
9701 delete for STEREO
7720 TDA9818
TUNER AGC
VIF AGC
AFC DETECTOR
VOLTAGE REFERENCE
VIF AMPLIFIER
FPLL
VCO TWD
VIDEO DEMODULATOR AND AMPLIFIER
SIF AMPLIFIER
QSS MIXER INTERCARRIER MIXER AM DEMODULATOR
FM-PLL DEMODULATOR
SIF AGC
INTERCARRIER MODE SWITCH
24
9702
AFV1 to IO_1,SF,APDOD
2734 2u2

LOGIC TU1A_B

MONO PAL BG/I	PAL BG	H
	PAL I	L
MONO OTHERS	PAL,SEC BG, PAL I	H
	PAL,SEC DK,SEC L,L'	L
STEREO	PAL BG,DK	H
	PAL I, SEC L,L'DK	L

1700	B4
1701	A4
1702	B9
1703	A9
1704	B10
1705	A10
1707	D5
1708	C5
1709	H6
1710	H7
1711	E10
2700	C2
2701	C4
2702	A6
2703	A5
2704	A3
2705	A6
2707	E2
2708	A11
2709	C8
2710	C8
2711	A3
2712	A8
2713	C12
2714	D11
2715	A14
2716	E12
2717	E11
2718	E8
2719	D7
2720	D6
2721	C5
2722	D7
2723	D7
2725	C6
2726	D8
2727	A5
2728	G9
2729	G9
2730	G12
2731	G11
2732	G10
2733	G10
2734	I9
2735	G12
2740	F8
2741	F7
3700	B3
3701	B2
3702	A10
3703	C3
3704	A7
3705	B9
3706	A9
3707	B7
3708	A6
3709	A7
3710	D3
3711	B14
3712	B6
3713	A11
3714	B10
3715	A13
3716	A12
3717	B12
3718	C10
3719	A11
3720	D8
3723	F2
3724	G2
3725	B11
3726	C8
3727	C10
3728	H4
3729	H5
3730	F2
3731	F3
3733	C4
3735	F9
3736	G10
3737	G11
3738	F12
3740	D9
3741	D10
3742	F7
3743	F8
3744	F8
3745	G7
4700	B8
4701	B12
4702	B4
4704	B3
4707	E3
4711	D3
4730	F13
5700	C1
5701	C4
5702	C5
5703	A6
5704	B11
5705	A4
5706	B8
5707	G10
5708	F13
5712	A11
6700	C2
6701	H4
6702	I4
6705	E3
6706	D9
6707	E9
7205-A	C7
7701-A	A8
7701-B	A12
7701-C	B12
7702	C9
7704	A13
7705	D13
7706	E3
7709	D2
7710	D3
7711	G8
7712	F9
7713	I4
7714	I5
7715	E10
7716	E9
7720	G9
9701	G13
9702	H13
9705	G13
9706	I3
F700	A4
F701	A5
F702	B4
F707	B8
F708	A7
F709	B2
F714	D11
F716	E10
F717	C4
F720	F11
I701	A5
I702	A5
I703	B4
I704	B4
I705	D10
I706	A14
I708	C3
I709	C2
I710	C5
I713	B6
I717	A7
I718	B9
I720	C9
I721	A9
I722	B10
I723	C8
I724	B10
I725	B12
I727	B13
I730	D11
I731	I4
I732	H4
I733	E12
I734	E12
I740	D5
I741	F14
I742	F3
I745	D3
I746	E6
I747	C4
I748	D6
I749	D7
I750	D7
I751	D8
I752	D8
I753	A12
I755	F9
I756	F9
I757	G10
I758	G9
I759	G10
I762	G10
I764	F12
I766	H13
I771	I9
c700	C6
c701	I7

TV-Processing (TV) - TV Board (TVBAD)


1
2
3
4
5
6
7
A
B
C
D
E
F
G
H
I
VRUB from IO_1
from PS
8TVB
SCLD from TXTCO
8TVB1
3204 1K5
3216 100R
3253 1R
VTV to TXTCO
1,9V
7201 BC857B
1,2V
I204
3203 2K2
3251 2K2
2201 1u
0205 IC-SCREENING
GNDTV
GNDTV1
GNDT
GNDTV4
GNDTV3
GNDTV2
I280
5,1V
7205-C * TDA8840
SCL
GNDTV1
I203
7205-B * TDA8840
2,4V
I266
3,8V
38
10
11
33
VSCIN from IO_1
3252 1R
2200 100n
I205
17
3,9V
CVBS_EXT
CVBS1O
CHROMA
CVBS_Y
REFO
CVBS SWITCH/ Color Dem.
NC2
IC1
IC2
28
2,7V
I207
29
2,3V
I208
30
2,3V
4200
4201
4202
0V
27
31
32
LUMO
IC3
IC4
for 25 INCH only
VFV1 from TU1
2231 1u
I206
13
3,8V
CVBS_INT
DEC_BG
NC1
XTAL2
XTAL1
DET
22
9
6,7V
16
35
2,5V
4203 not used
I210
I214
34
2,5V
36
4,9V
I219
I220
2203 22n
2202 2u2
2205 220n
1200 4M433619 not PAL
I218
2204 18p delete for not PAL
1201 3MHZ579545 for NTSC only
I215
2209 18p
2208 not used
I213
3213 100K
I211
2214 3n3
2211 100n
8TVB1
8TVB
GNDTV
14
BCI from LS
1M 3207
I267
2M2 3205
2n2 2207 (Sandcastle)
3206 330K
I216
3209 220K
3210 1M
2210 2n2
I225
5205 BLM21
F201
2213 10n
2212 100u
2232 10n
8TVB
3249 680R
2237 100p
I200
3250 18K
4,9V
BC8
721
0,9V
0,4V
10
7205-D * TDA8840
3,2V
8V
42
37
I224
3242 15K
I226
43
4V
PH1LF
PH2LF
V_P2
HOUT
40
0,7V
I237
3234 1K
I238
2228 1u
2229 4n7
VERT HOR
DECDIG
39
4,9V
I236
2221 220n
3248 15K
HFB from LS
3211 15K
I222
41
0,5V
FBISO
HFB to TXTCO
3212 15K
I227
51
3,8V
3,9V
52
VSC
I_REF
AVL
GND2
EHTO
45
0V
44
I234
3235 1K
for 25" only
2227 100n
I228
3239 39K 1%
VDRA
VDRB
46
2,4V
47
2,4V
50
2,1V
2230 1n
I229
I230
I235
F203
2233 4u7 delete for 25"
2222 1n
2226 1n
3236 1K
5203 BLM21
5204 BLM21
2223 22n
2238 1n
GNDT
3237 3K3
2225 1n
2224 1n
12
11
VDRN to LS
VDRP to LS
EHT_PROT from LS
EWDR to LS
HDR to LS

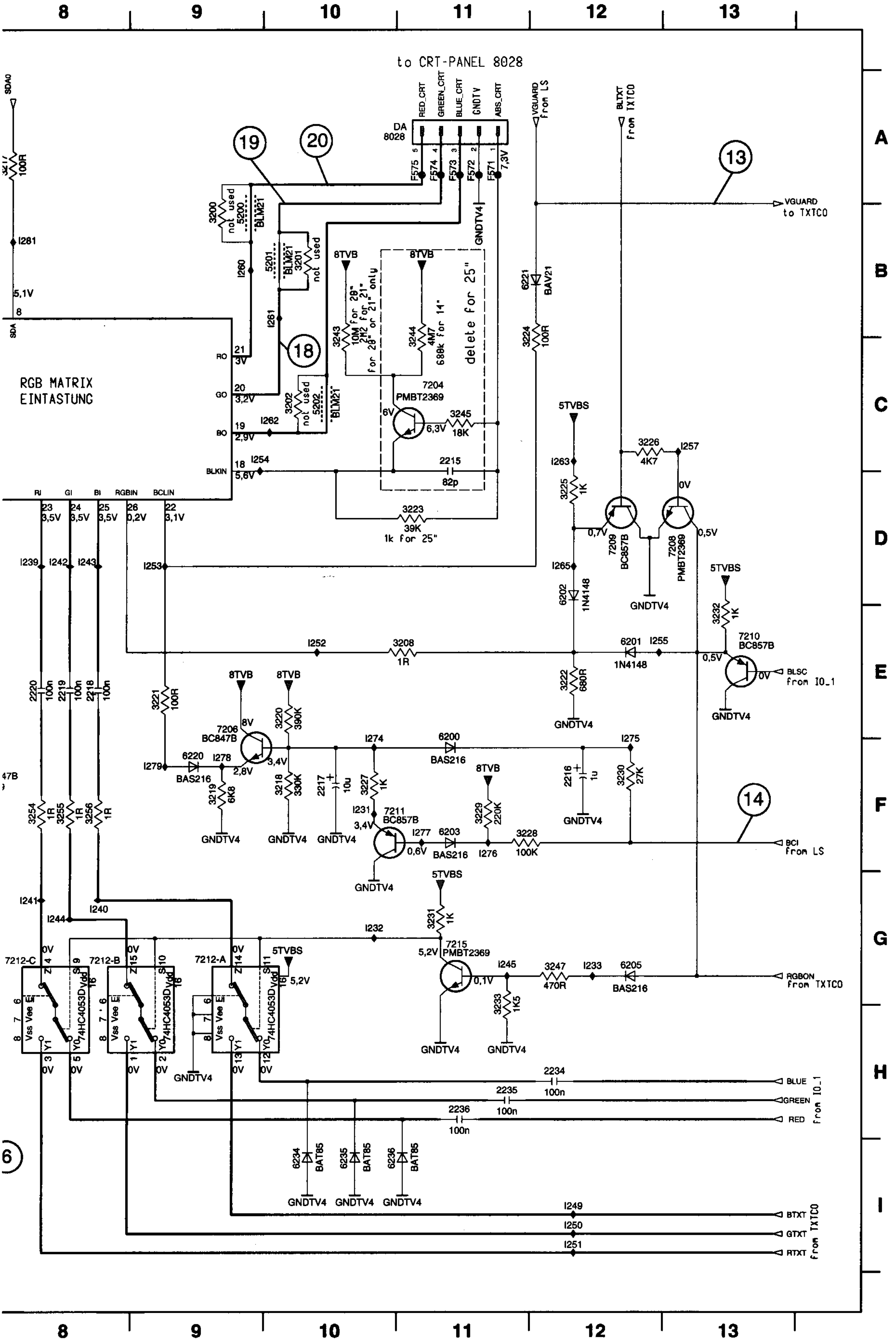
∗ Pos. 7205: TDA8842 for BGDK or BGIL
TDA8844 for 25"
TDA8841 for non-standard NTSC-playback
and not BGDK or BGIL

...V MEASURED IN PLAYBACK MODE

☐...V MEASURED IN RECORD MODE

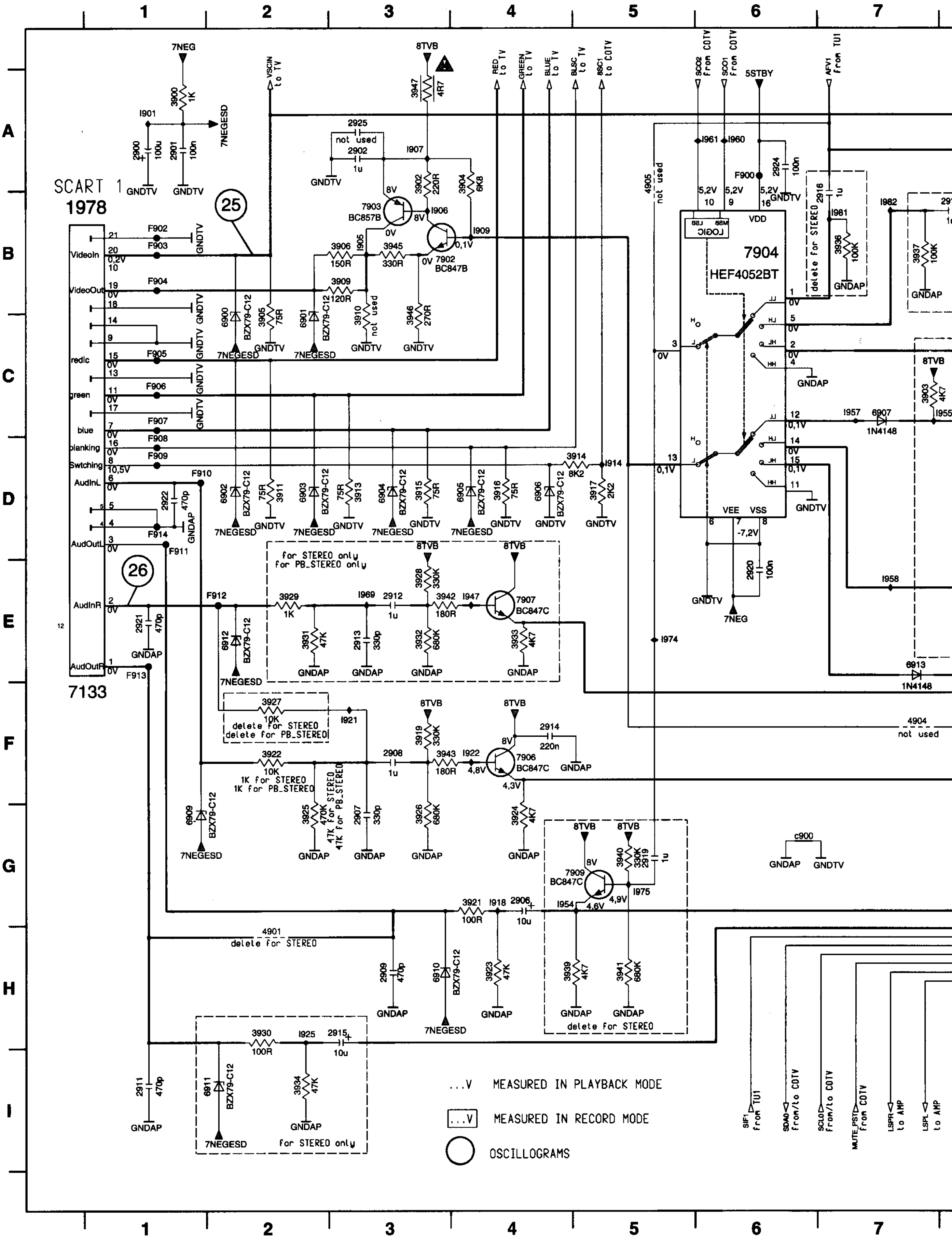
○ OSCILLOGRAMS

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	
]

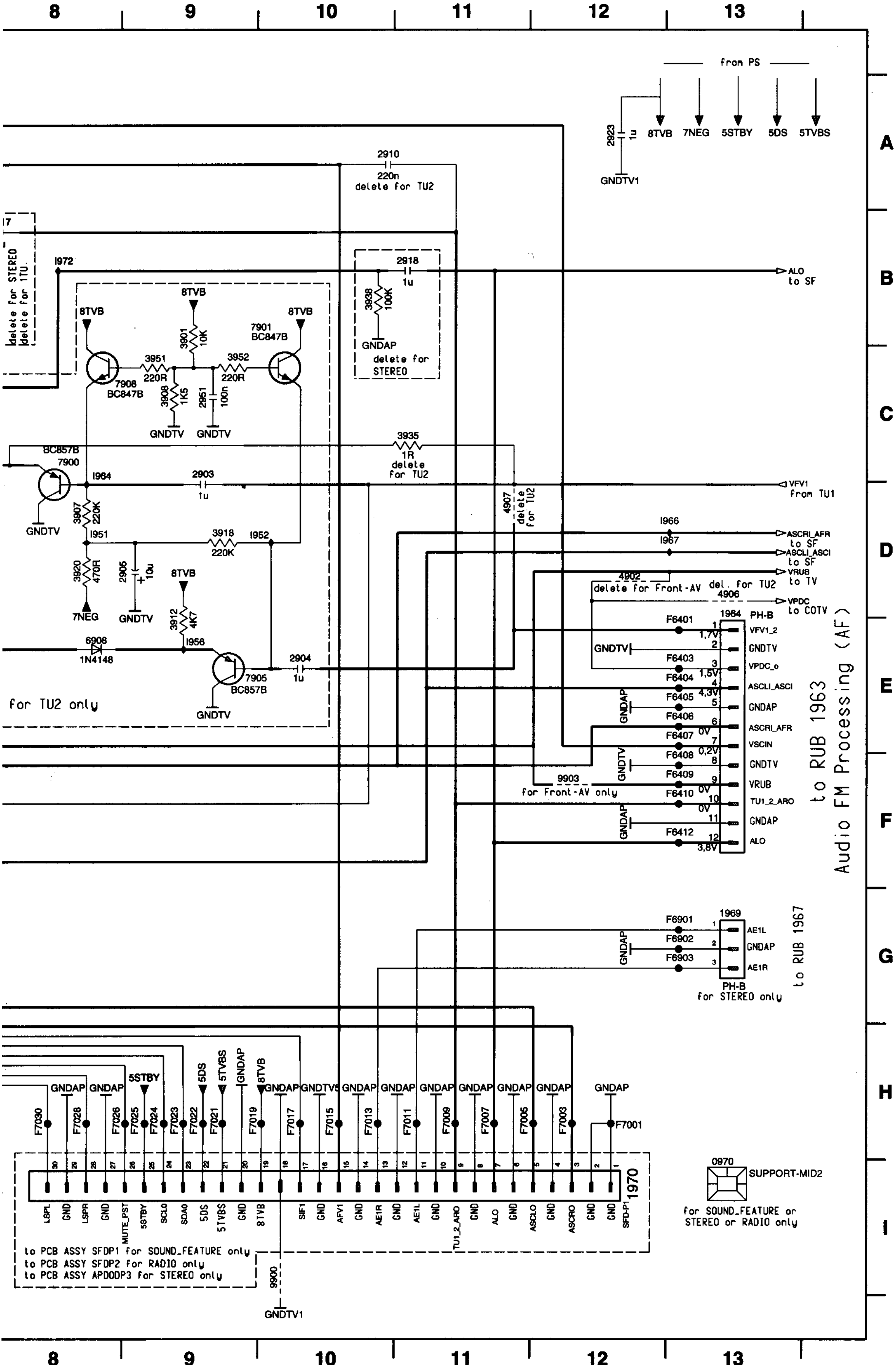

8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
to CRT-PANEL 8028
RED_CRT
GREEN_CRT
BLUE_CRT
GNDTV
ABS_CRT
DA 8028
F575
F574
F573
F572
F571
7,3V
VGUARD from LS
BLTXT from TXTCO
VGUARD to TXTCO
19
20
13
18
14
6
SDA0
SDA
3217 100R
I281
5,1V
3200 not used
5200 "BLM21"
3201 not used
5201 "BLM21"
3202 not used
5202 "BLM21"
I260
I261
I262
I254
GNDTV4
8TVB
3243 10M for 28" 2M2 for 21" for 28" or 21" only
3244 4M7 688k for 14"
delete for 25"
7204 PMBT2369
6V
6,3V
3245 18K
2215 82p
3223 39K 1k for 25"
6221 BAV21
3224 100R
RGB MATRIX EINTASTUNG
RO
GO
BO
BLKIN
21 3V
20 3,2V
19 2,9V
18 5,6V
RI
GI
BI
RGBIN
BCLIN
23 3,5V
24 3,5V
25 3,5V
26 0,2V
22 3,1V
I239
I242
I243
I253
5TVBS
I263
3225 1K
3226 4K7
I257
0V
0,7V
0,5V
7209 BC857B
7208 PMBT2369
I265
6202 1N4148
3232 1K
I252
3208 1R
6201 1N4148
I255
0,5V
7210 BC857B
0V
BLSC from IO_1
3222 680R
2220 100n
2219 100n
2218 100n
3221 100R
7206 BC847B
8V
3220 390K
I274
6200 BAS216
I275
I279
6220 BAS216
I278
2,8V
3,4V
3219 6K8
3218 330K
2217 10u
3227 1K
2216 1u
3230 27K
I231
3,4V
7211 BC857B
I277
6203 BAS216
0,6V
I276
3229 220K
3228 100K
BCI from LS
3254 1R
3255 1R
3256 1R
I241
I244
I240
I232
3231 1K
7215 PMBT2369
5,2V
0,1V
I245
3247 470R
I233
6205 BAS216
RGBON from TXTCO
3233 1K5
7212-C
7212-B
7212-A
74HC4053D
Vss Vee
Vdd
Z
S
E
Y1
Y0
5,2V
2234 100n
2235 100n
2236 100n
BLUE
GREEN
RED
from IO_1
6234 BAT85
6235 BAT85
6236 BAT85
I249
I250
I251
BTXT
GTXT
RTXT
from TXTCO
47B

0205	B5
1200	D3
1201	D4
2200	C1
2201	B3
2202	D2
2203	D2
2204	D3
2205	D2
2207	E2
2208	D4
2209	D4
2210	E4
2211	E5
2212	E6
2213	E6
2214	D5
2215	C11
2216	F12
2217	F10
2218	E8
2219	E8
2220	E8
2221	F6
2222	G6
2223	H6
2224	I5
2225	H5
2226	G5
2227	G3
2228	F3
2229	F4
2230	G5
2231	D1
2232	E6
2233	G6
2234	H12
2235	H11
2236	H11
2237	E7
2238	H6
3200	B9
3201	B10
3202	C10
3203	B2
3204	A1
3205	E2
3206	E3
3207	E1
3208	E11
3209	E3
3210	E4
3211	F2
3212	G2
3213	D5
3216	A7
3217	A8
3218	F10
3219	F9
3220	E10
3221	E9
3222	E12
3223	D11
3224	B11
3225	D12
3226	C12
3227	F10
3228	F11
3229	F11
3230	F12
3231	G11
3232	E13
3233	G11
3234	F6
3235	F7
3236	G5
3237	H5
3239	G3
3242	F4
3243	B10
3244	B11
3245	C11
3247	G12
3248	F7
3249	E7
3250	F7
3251	B2
3252	C1
3253	A3
3254	F8
3255	F8
3256	F8
4200	C6
4201	C6
4202	C6
4203	D3
5200	B9
5201	B10
5202	C10
5203	H5
5204	H5
5205	E6
6200	F11
6201	E12
6202	D12
6203	F11
6205	G12
6220	F9
6221	B11
6234	I10
6235	I10
6236	I10
7201	B1
7204	C11
7205-B	C2
7205-C	B7
7205-D	F4
7206	E9
7208	D13
7209	D12
7210	E13
7211	F11
7212-A	G9
7212-B	G8
7212-C	G8
7215	G11
7219	F7
8028	A11
F201	E7
F203	G6
F571	A11
F572	A11
F573	A11
F574	A11
F575	A11
I200	F7
I203	C2
I204	B2
I205	C1
I206	C2
I207	C6
I208	C6
I210	D3
I211	D5
I213	D5
I214	D4
I215	D4
I216	E4
I218	D3
I219	D2
I220	D2
I222	F2
I224	F3
I225	E5
I226	F4
I227	G4
I228	G4
I229	G5
I230	G5
I231	F10
I232	G10
I233	G12
I234	F6
I235	G6
I236	F6
I237	F6
I238	F6
I239	D8
I240	G8
I241	G8
I242	D8
I243	D8
I244	G8
I245	G11
I249	I12
I250	I12
I251	I12
I252	E10
I253	D9
I254	C9
I255	E12
I257	C13
I260	B9
I261	B10
I262	C10
I263	C12
I265	D12
I266	C3
I267	E2
I274	E10
I275	E12
I276	F11
I277	F11
I278	F9
I279	F9
I280	B7
I281	B8

Input/Output (IO_1) - TV Board (TVBAD)

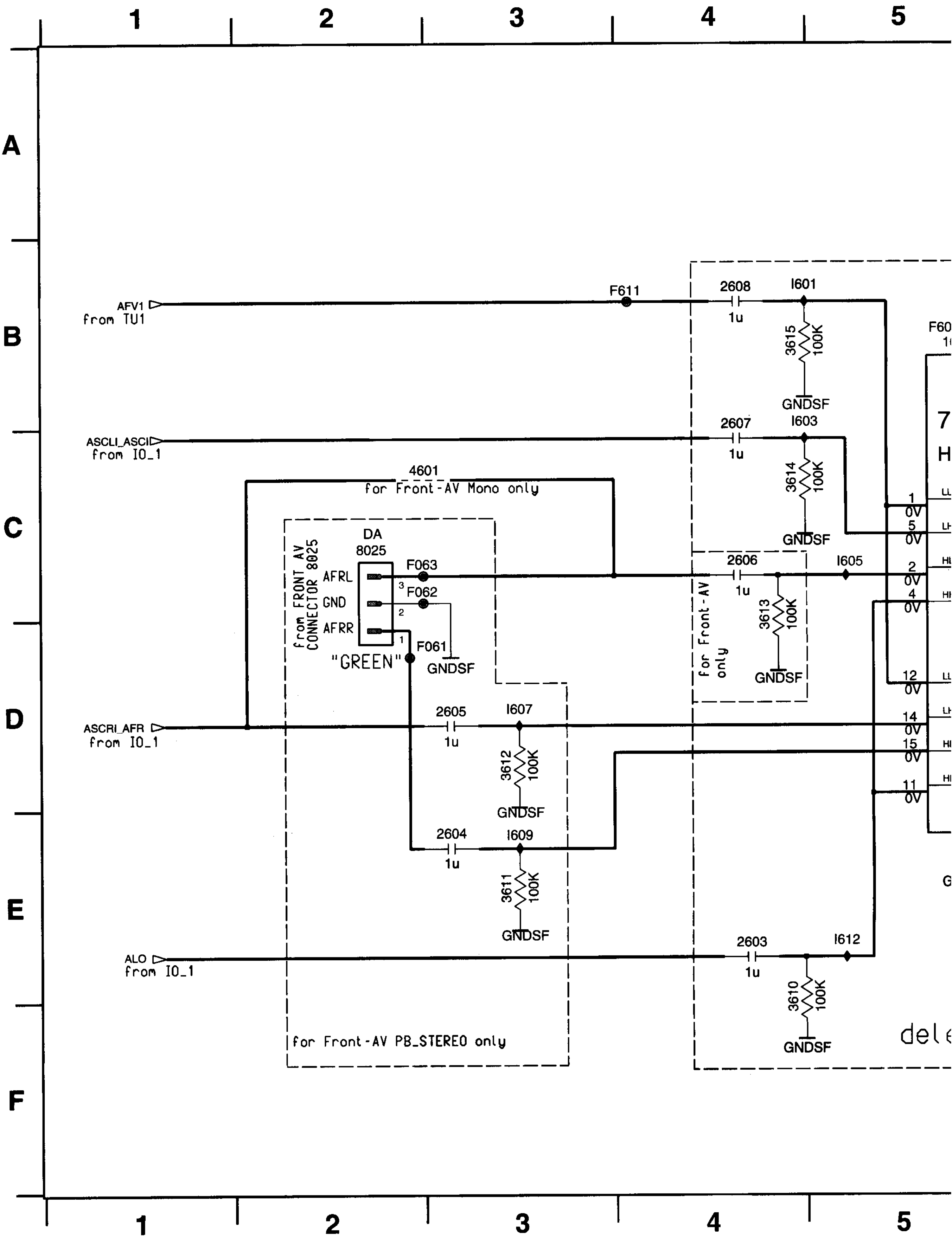

1 2 3 4 5 6 7
A B C D E F G H I
SCART 1
1978
7133
VideoIn
VideoOut
redic
green
blue
blanking
Swtching
AudInL
AudOutL
AudInR
AudOutR
F902
F903
F904
F905
F906
F907
F908
F909
F910
F911
F912
F913
F914
0,2V
10,5V
7NEG
3900 1K
I901
2900 100u
2901 100n
7NEGESD
GNDTV
GNDAP
VSCIN to TV
8TVB
3947 4R7
2925 not used
2902 1u
I907
3902 220R
3904 6K8
7903 BC857B
I906
I909
7902 BC847B
3906 150R
I905
3945 330R
3909 120R
3910 not used
3946 270R
6900 BZX79-C12
3905 75R
6901 BZX79-C12
RED to TV
GREEN to TV
BLUE to TV
BUSC to TV
8SC1 to COTV
6902 BZX79-C12
3911 75R
6903 BZX79-C12
3913 75R
6904 BZX79-C12
3915 75R
6905 BZX79-C12
3916 75R
6906 BZX79-C12
3914 8K2
I914
3917 2K2
2922 470p
4905 not used
SCO2 from COTV
SCO1 from COTV
5STBY
I961
I960
F900
2924 100n
7904
HEF4052BT
LOGIC
VDD
VEE
VSS
-7,2V
2920 100n
7NEG
AFV1 from TU1
2916 1u
I981
3936 100K
delete for STEREO
I982
3937 100K
8TVB
3903 4K7
I957
6907 1N4148
I955
I958
I974
6913 1N4148
4904 not used
25
26
for STEREO only
for PB_STEREO only
3929 1K
I969
2912 1u
3928 330K
3942 180R
I947
7907 BC847C
3931 47K
2913 330p
3932 680K
3933 4K7
2921 470p
6912 BZX79-C12
3927 10K
delete for STEREO
delete for PB_STEREO
I921
3922 10K
1K for STEREO
1K for PB_STEREO
3925 470K STEREO 47K for PB_STEREO
2907 330p
2908 1u
3919 330K
3943 180R
I922
4,8V
7906 BC847C
2914 220n
3926 680K
3924 4K7
4,3V
6909 BZX79-C12
7909 BC847C
3940 330K
2919 1u
I975
4,9V
4,6V
I954
3921 100R
I918
2906 10u
4901 delete for STEREO
2909 470p
6910 BZX79-C12
3923 47K
3939 4K7
3941 680K
c900
3930 100R
I925
2915 10u
2911 470p
6911 BZX79-C12
3934 47K
for STEREO only
...V MEASURED IN PLAYBACK MODE
...V MEASURED IN RECORD MODE
OSCILLOGRAMS
SIF1 from TU1
SDA0 from/to COTV
SCL0 from/to COTV
MUTE_PST from COTV
LSPR to AMP
LSPL to AMP

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

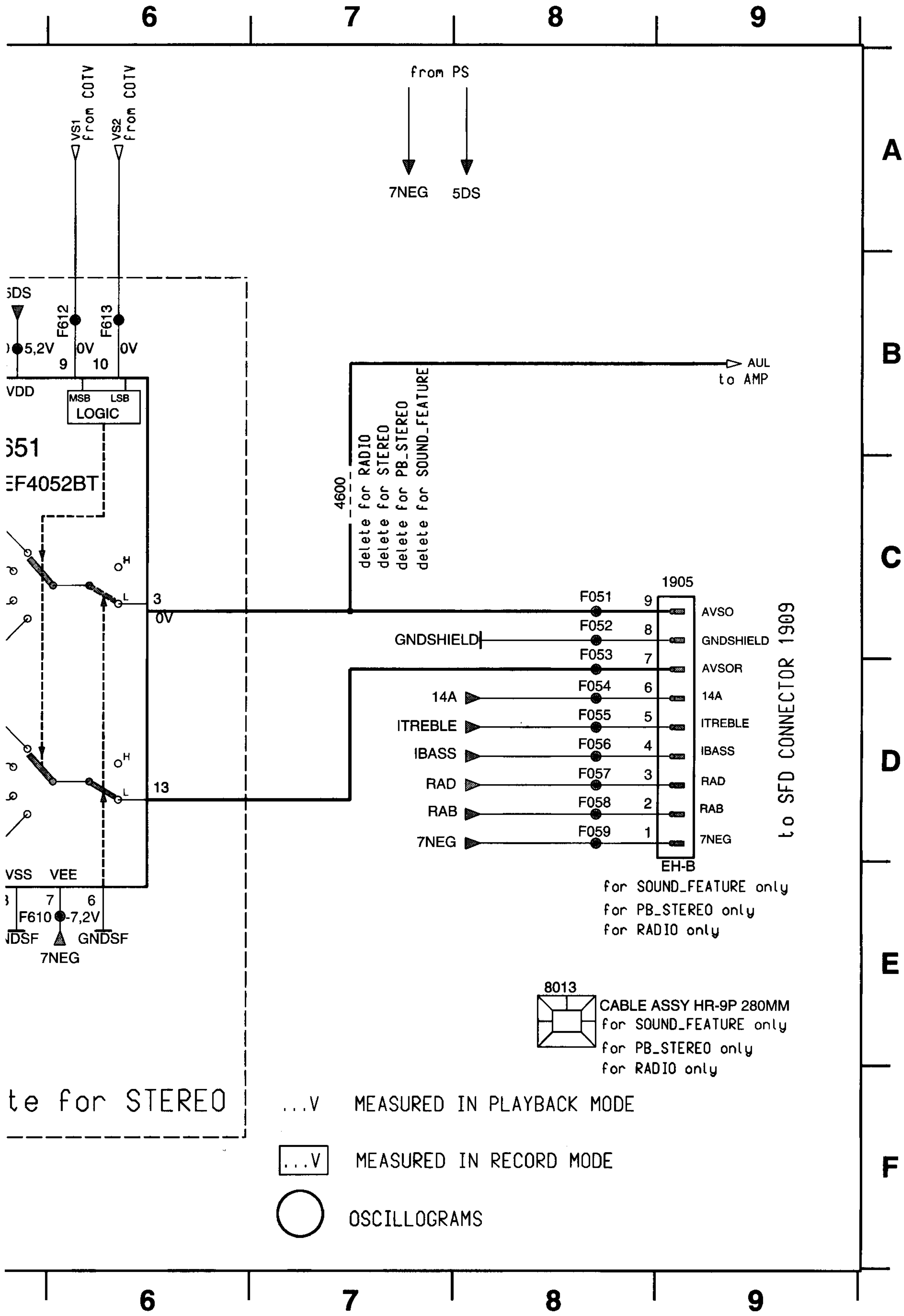

8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
from PS
8TVB
7NEG
5STBY
5DS
5TVBS
2923
1u
GNDTV1
2910
220n
delete for TU2
delete for STEREO
delete for 1TU
I972
2918
1u
3938
100K
GNDAP
delete for STEREO
ALO
to SF
8TVB
3901
10K
7901
BC847B
3951
220R
3952
220R
7908
BC847B
3908
1K5
2951
100n
GNDTV
3935
1R
delete for TU2
BC857B
7900
I964
2903
1u
VFV1
from TU1
4907
delete for TU2
3907
220K
I951
3918
220K
I952
I966
I967
ASCRI_AFR
to SF
ASCLI_ASCI
to SF
VRUB
to TV
4902
delete for Front-AV
del. for TU2
4906
VPDC
to COTV
3920
470R
2905
10u
7NEG
3912
4K7
6908
1N4148
I956
7905
BC857B
2904
1u
for TU2 only
F6401
F6403
F6404
F6405
F6406
F6407
F6408
F6409
F6410
F6412
1964
PH-B
1,7V
1,5V
4,3V
0V
0,2V
0V
0V
3,8V
VFV1_2
GNDTV
VPDC_o
ASCLI_ASCI
GNDAP
ASCRI_AFR
VSCIN
GNDTV
VRUB
TU1_2_ARO
GNDAP
ALO
9903
for Front-AV only
to RUB 1963
Audio FM Processing (AF)
F6901
F6902
F6903
1969
AE1L
GNDAP
AE1R
PH-B
for STEREO only
to RUB 1967
5STBY
5DS
5TVBS
GNDAP
8TVB
GNDTV
F7001
F7003
F7005
F7007
F7009
F7011
F7013
F7015
F7017
F7019
F7021
F7022
F7023
F7024
F7025
F7026
F7028
F7030
1970
LSPL
GND
LSPR
MUTE_PST
5STBY
SCLO
SDAO
5DS
5TVBS
8TVB
SIF1
AFV1
AE1R
AE1L
TU1_2_ARO
ALO
ASCLO
ASCRO
SFD-P1
to PCB ASSY SFDP1 for SOUND_FEATURE only
to PCB ASSY SFDP2 for RADIO only
to PCB ASSY APDODP3 for STEREO only
9900
GNDTV1
0970
SUPPORT-MID2
for SOUND_FEATURE or STEREO or RADIO only

0970	I13
1964	D13
1969	G13
1970	I12
1978	B1
2900	A1
2901	A1
2902	A3
2903	C9
2904	E10
2905	D9
2906	G4
2907	G3
2908	F3
2909	H3
2910	A10
2911	I1
2912	E3
2913	E3
2914	F4
2915	H3
2916	B7
2917	B8
2918	B11
2919	G5
2920	E6
2921	E1
2922	D1
2923	A12
2924	A6
2925	A3
2951	C9
3900	A1
3901	B9
3902	A3
3903	C7
3904	A4
3905	C2
3906	B3
3907	D8
3908	C9
3909	B3
3910	C3
3911	D2
3912	E9
3913	D3
3914	D5
3915	D3
3916	D4
3917	D5
3918	D9
3919	F3
3920	D8
3921	G4
3922	F2
3923	H4
3924	G4
3925	G2
3926	G3
3927	F2
3928	E3
3929	E2
3930	H2
3931	E2
3932	E3
3933	E4
3934	I2
3935	C11
3936	B7
3937	B7
3938	B10
3939	H4
3940	G5
3941	H5
3942	E3
3943	F3
3945	B3
3946	C3
3947	A3
3951	C9
3952	C9
4901	H2
4902	D12
4904	F7
4905	A5
4906	D13
4907	D11
6900	C2
6901	C2
6902	D2
6903	D2
6904	D3
6905	D4
6906	D4
6907	C7
6908	E8
6909	G1
6910	H3
6911	I2
6912	E2
6913	E7
7900	C8
7901	B10
7902	B4
7903	B3
7904	B6
7905	E10
7906	F4
7907	E4
7908	C8
7909	G5
9900	I10
9903	F12
F6401	E13
F6403	E13
F6404	E13
F6405	E13
F6406	E13
F6407	E13
F6408	F13
F6409	F13
F6410	F13
F6412	F13
F6901	G13
F6902	G13
F6903	G13
F7001	H12
F7003	H12
F7005	H11
F7007	H11
F7009	H11
F7011	H11
F7013	H10
F7015	H10
F7017	H10
F7019	H9
F7021	H9
F7022	H9
F7023	H9
F7024	H9
F7025	H9
F7026	H8
F7028	H8
F7030	H8
F900	A6
F902	B1
F903	B1
F904	B1
F905	C1
F906	C1
F907	C1
F908	D1
F909	D1
F910	D1
F911	D1
F912	E2
F913	E1
F914	D1
I901	A1
I905	B3
I906	B3
I907	A3
I909	B4
I914	D5
I918	G4
I921	F3
I922	F4
I925	H2
I947	E4
I951	D8
I952	D10
I954	G4
I955	C8
I956	E9
I957	C7
I958	E7
I960	A6
I961	A6
I964	C8
I966	D13
I967	D13
I969	E3
I972	B8
I974	E5
I975	G5
I981	B7
I982	B7
c900	G6

View Selector Audio (SF) - TV Board (TVBAD)


1
2
3
4
5
A
B
C
D
E
F
AFV1
from TU1
F611
2608
1u
I601
3615
100K
GNDSF
F60
7
H
ASCLI_ASCI
from IO_1
2607
1u
I603
3614
100K
GNDSF
4601
for Front-AV Mono only
from FRONT AV CONNECTOR 8025
DA
8025
AFRL
GND
AFRR
3
2
1
F063
F062
F061
"GREEN"
GNDSF
2606
1u
I605
3613
100K
GNDSF
for Front-AV only
1
0V
5
0V
2
0V
4
0V
12
0V
14
0V
15
0V
11
0V
ASCRI_AFR
from IO_1
2605
1u
I607
3612
100K
GNDSF
2604
1u
I609
3611
100K
GNDSF
ALO
from IO_1
2603
1u
I612
3610
100K
GNDSF
for Front-AV PB_STEREO only
del
G

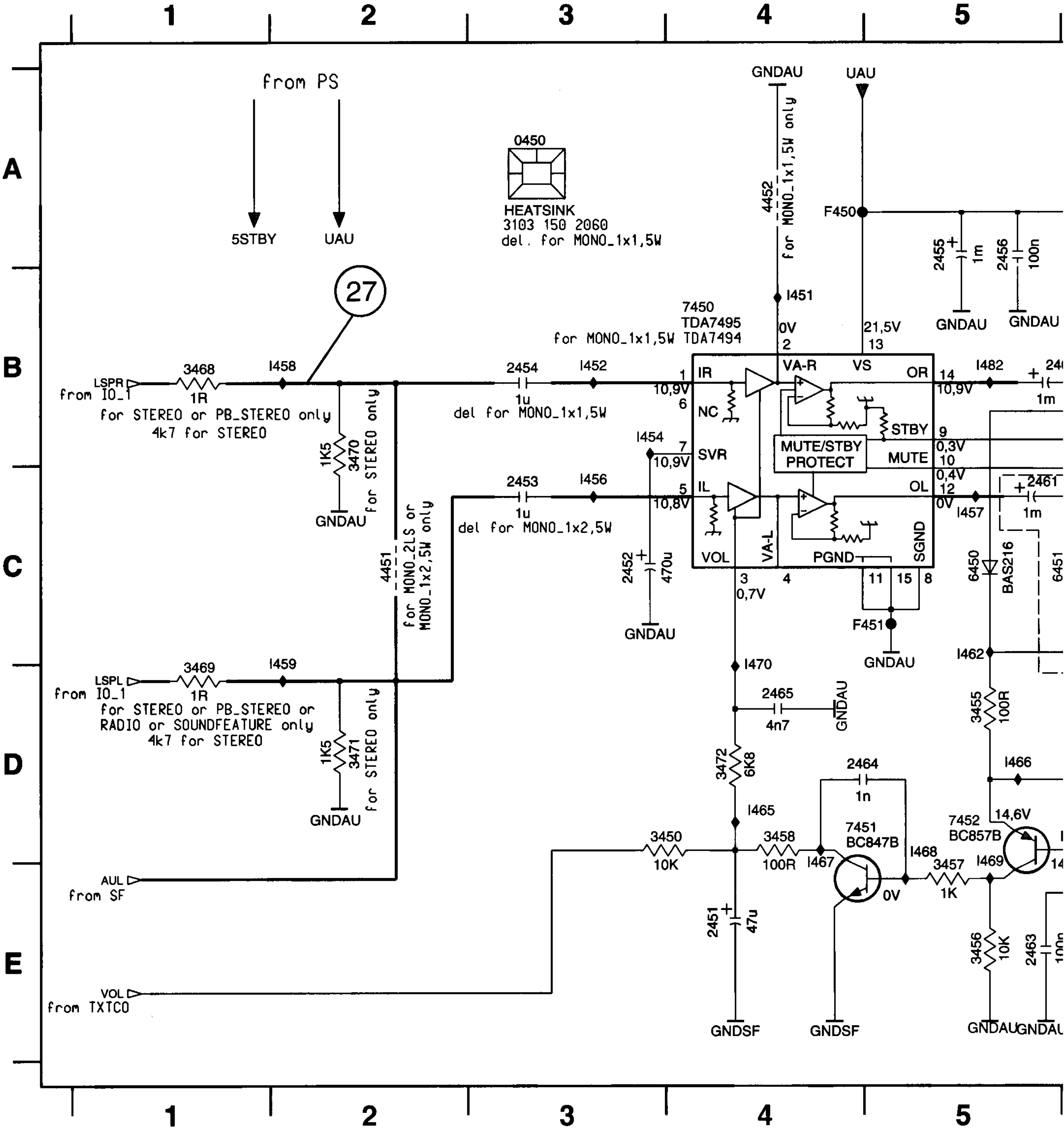
	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	


6
7
8
9
A
B
C
D
E
F
VS1 from COTV
VS2 from COTV
from PS
7NEG
5DS
5DS
F612
F613
5,2V
0V
0V
9
10
VDD
MSB
LSB
LOGIC
651
EF4052BT
H
L
3
0V
13
VSS
VEE
7
6
F610
-7,2V
GNDSF
GNDSF
7NEG
AUL
to AMP
4600
delete for RADIO
delete for STEREO
delete for PB_STEREO
delete for SOUND_FEATURE
1905
F051
F052
F053
F054
F055
F056
F057
F058
F059
GNDSHIELD
14A
ITREBLE
IBASS
RAD
RAB
7NEG
AVSO
GNDSHIELD
AVSOR
14A
ITREBLE
IBASS
RAD
RAB
7NEG
EH-B
to SFD CONNECTOR 1909
for SOUND_FEATURE only
for PB_STEREO only
for RADIO only
8013
CABLE ASSY HR-9P 280MM
for SOUND_FEATURE only
for PB_STEREO only
for RADIO only
te for STEREO
...V MEASURED IN PLAYBACK MODE
...V MEASURED IN RECORD MODE
OSCILLOGRAMS

1905	C9
2603	E4
2604	E3
2605	D3
2606	C4
2607	B4
2608	B4
3610	E4
3611	E3
3612	D3
3613	C4
3614	C4
3615	B4
4600	C7
4601	C2
7651	C5
8013	E8
8025	C2
F051	C8
F052	C8
F053	C8
F054	D8
F055	D8
F056	D8
F057	D8
F058	D8
F059	D8
F061	D3
F062	C2
F063	C2
F600	B5
F610	E6
F611	B4
F612	B6
F613	B6
I601	B4
I603	B4
I605	C5
I607	D3
I609	E3
I612	E5

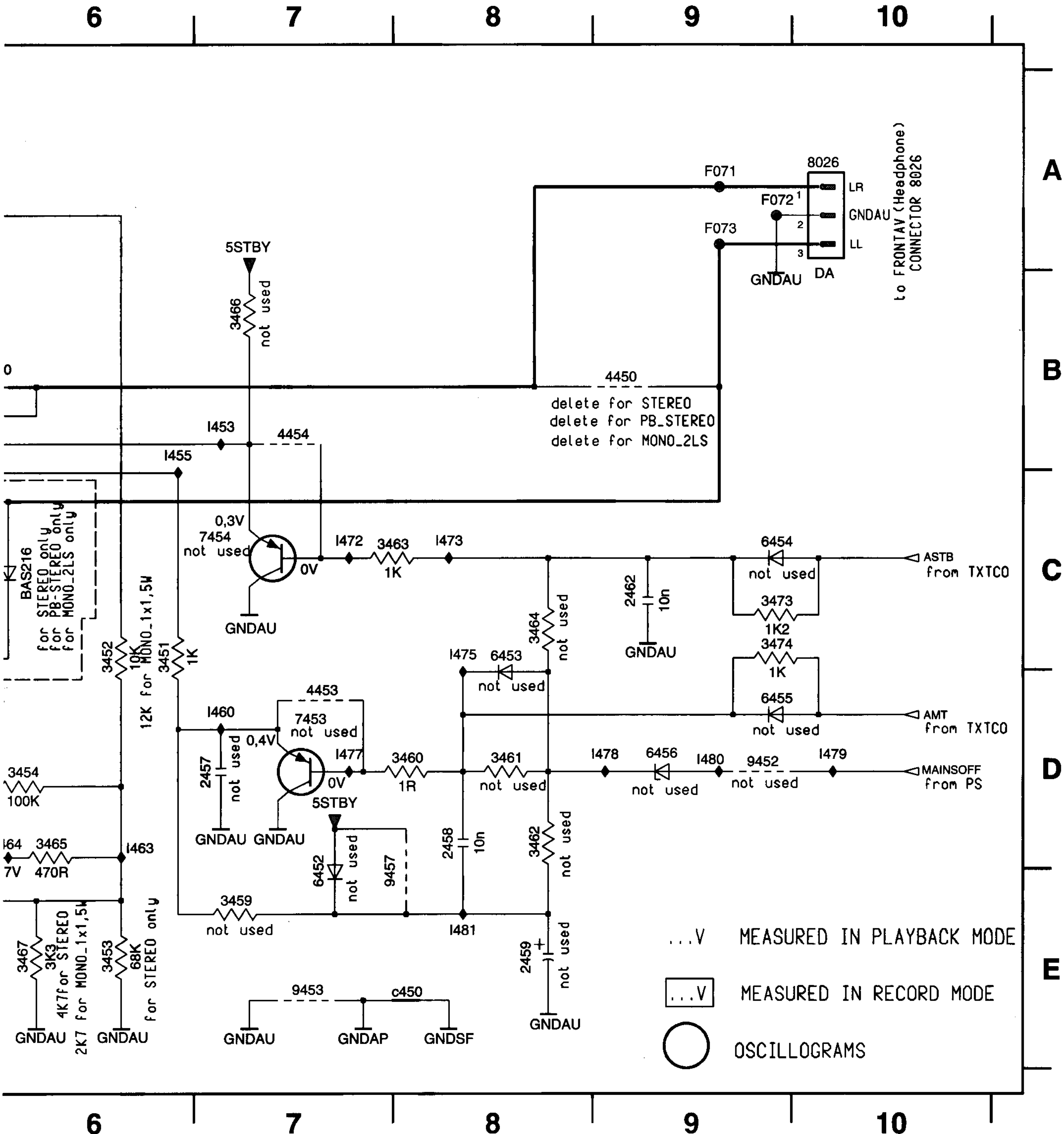
Amplifier (AMP) - TV Board (TVBAD)

0450 A3	2454 B3	2458 D8	2462 C9	3450 D3	3454 D6	3458 D4	3462 D8	3466 B7	3470 B2	3474 C9	4453 D7
2451 E4	2455 A5	2459 E8	2463 E5	3451 C6	3455 D5	3459 E7	3463 C7	3467 E6	3471 D2	4450 B9	4454 B7
2452 C3	2456 A5	2460 B5	2464 D4	3452 C6	3456 E5	3460 D8	3464 C8	3468 B1	3472 D4	4451 C2	6450 C5
2453 C3	2457 D7	2461 C5	2465 D4	3453 E6	3457 E5	3461 D8	3465 D6	3469 D1	3473 C9	4452 A4	6451 C6

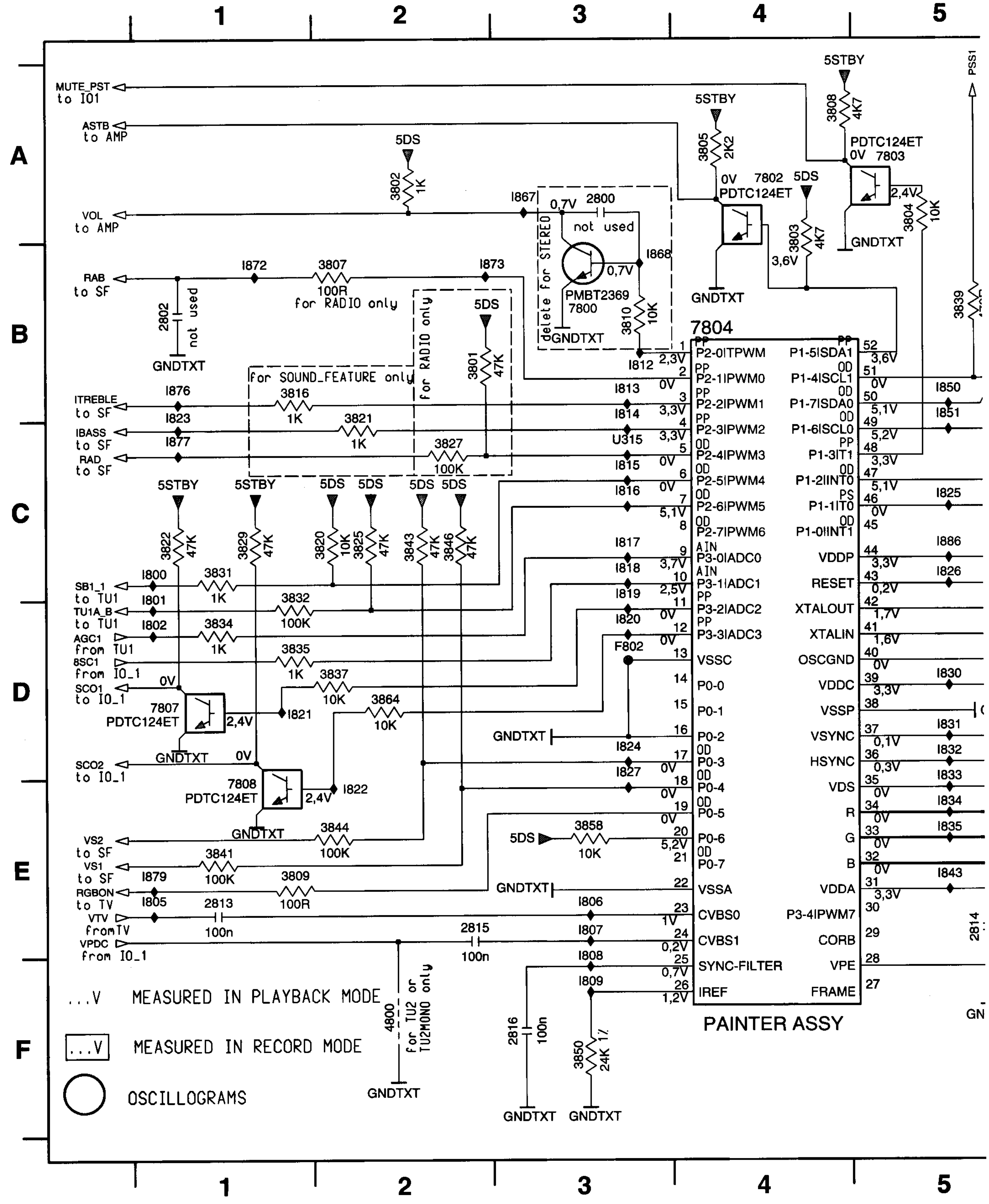

1
2
3
4
5
A
B
C
D
E
from PS
5STBY
UAU
0450
HEATSINK
3103 150 2060
del. for MONO_1x1,5W
GNDAU
UAU
4452
for MONO_1x1,5W only
F450
2455
1m
2456
100n
GNDAU
GNDAU
27
I451
7450
TDA7495
for MONO_1x1,5W TDA7494
0V
2
21,5V
13
LSPR
from IO_1
3468
1R
I458
for STEREO or PB_STEREO only
4k7 for STEREO
2454
1u
I452
del for MONO_1x1,5W
1
10,9V
6
IR
NC
VA-R
VS
OR
14
10,9V
I482
1m
STBY
9
0,3V
MUTE/STBY PROTECT
MUTE
10
0,4V
12
0V
OL
2461
1m
I457
1K5
3470
for STEREO only
GNDAU
I454
7
10,9V
SVR
2453
1u
I456
5
10,8V
IL
del for MONO_1x2,5W
4451
for MONO_2LS or MONO_1x2,5W only
VOL
VA-L
PGND
SGND
3
0,7V
4
11
15
8
2452
470u
GNDAU
F451
GNDAU
6450
BAS216
6451
I462
LSPL
from IO_1
3469
1R
I459
for STEREO or PB_STEREO or RADIO or SOUNDFEATURE only
4k7 for STEREO
I470
2465
4n7
GNDAU
3455
100R
1K5
3471
for STEREO only
GNDAU
3472
6K8
2464
1n
I466
I465
7451
BC847B
7452
BC857B
14,6V
AUL
from SF
3450
10K
3458
100R
I467
I468
3457
1K
I469
0V
2451
47u
3456
10K
2463
VOL
from TXTCO
GNDSF
GNDSF
GNDAU
GNDAU

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

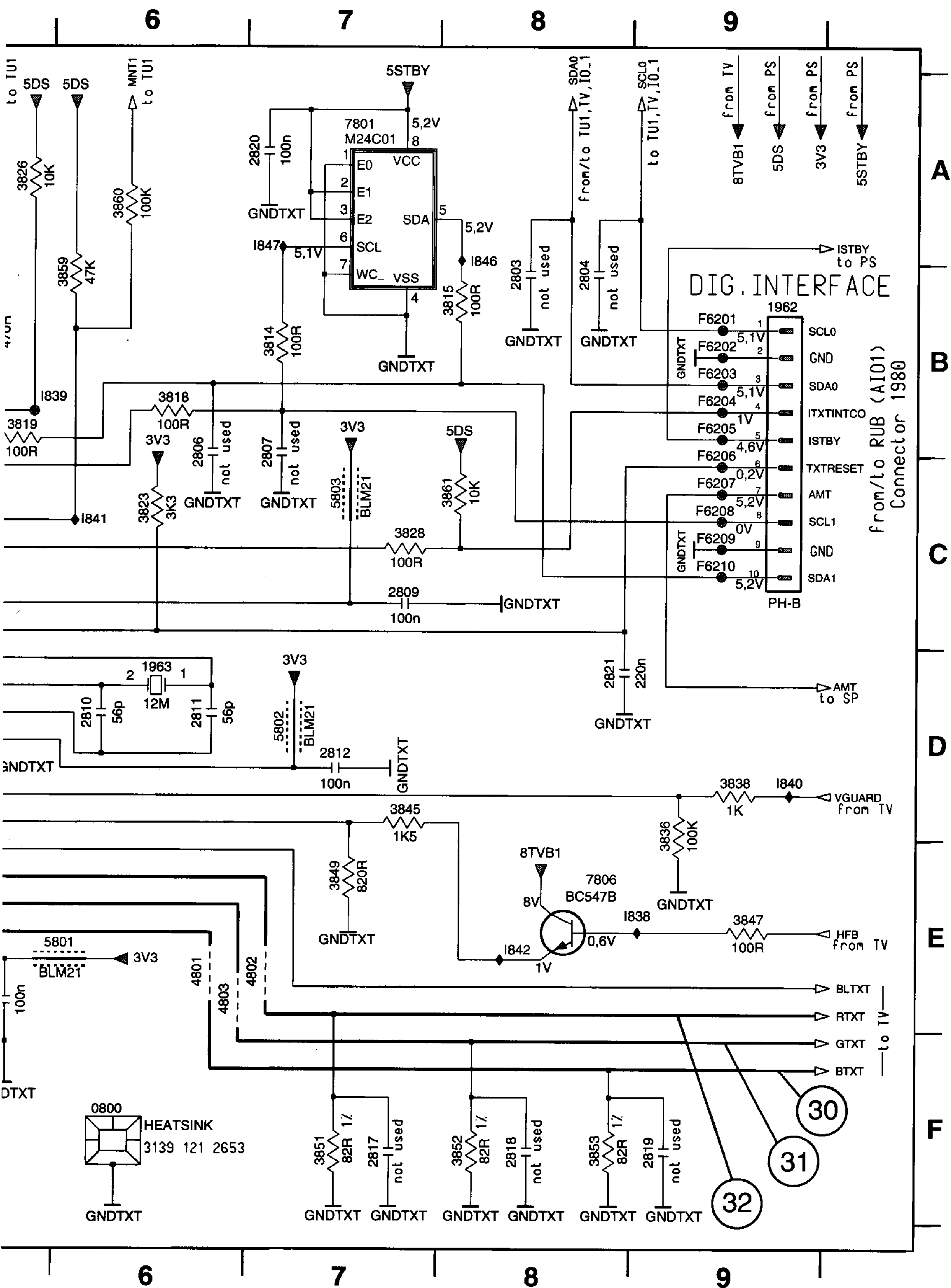
6452 E7	6456 D9	7453 D7	9453 E9	F073 A9	I452 B3	I456 C3	I460 D7	I465 D4	I469 D5	I475 C8	I480 D9
6453 C8	7450 B4	7454 C7	9457 E8	F450 A4	I453 B7	I457 C5	I462 C5	I466 D5	I470 C4	I477 D7	I481 E8
6454 C9	7451 D5	8026 A10	F071 A9	F451 C5	I454 B3	I458 B2	I463 D6	I467 D4	I472 C7	I478 D9	I482 B5
6455 D9	7452 D5	9452 D9	F072 A9	I451 B4	I455 B6	I459 C2	I464 D6	I468 D5	I473 C8	I479 D10	c450 E10


6
7
8
9
10
A
B
C
D
E
8026
F071
F072
F073
LR
GNDAU
LL
1
2
3
DA
GNDAU
to FRONTAV(Headphone) CONNECTOR 8026
5STBY
3466
not used
4450
delete for STEREO
delete for PB_STEREO
delete for MONO_2LS
I453
4454
I455
0,3V
7454
not used
0V
GNDAU
I472
3463
1K
I473
6454
not used
3473
1K2
ASTB from TXTCO
2462
10n
GNDAU
3464
not used
BAS216
for STEREO only
for PB-STEREO only
for MONO_2LS only
3452
10K
12K for MONO_1x1,5W
3451
1K
I475
6453
not used
3474
1K
6455
not used
AMT from TXTCO
4453
I460
7453
not used
0,4V
I477
3460
1R
3461
not used
I478
6456
not used
I480
9452
not used
I479
MAINSOFF from PS
2457
not used
0V
GNDAU
GNDAU
5STBY
3454
100K
I464
3465
470R
7V
I463
6452
not used
9457
2458
10n
3462
not used
3459
not used
I481
3467
3K3
4K7for STEREO
2K7 for MONO_1x1,5W
3453
68K
for STEREO only
GNDAU
GNDAU
2459
not used
GNDAU
9453
c450
GNDAU
GNDAP
GNDSF
...V MEASURED IN PLAYBACK MODE
...V MEASURED IN RECORD MODE
OSCILLOGRAMS

Teletext Controller (COTV) - TV Board (TVBAD)

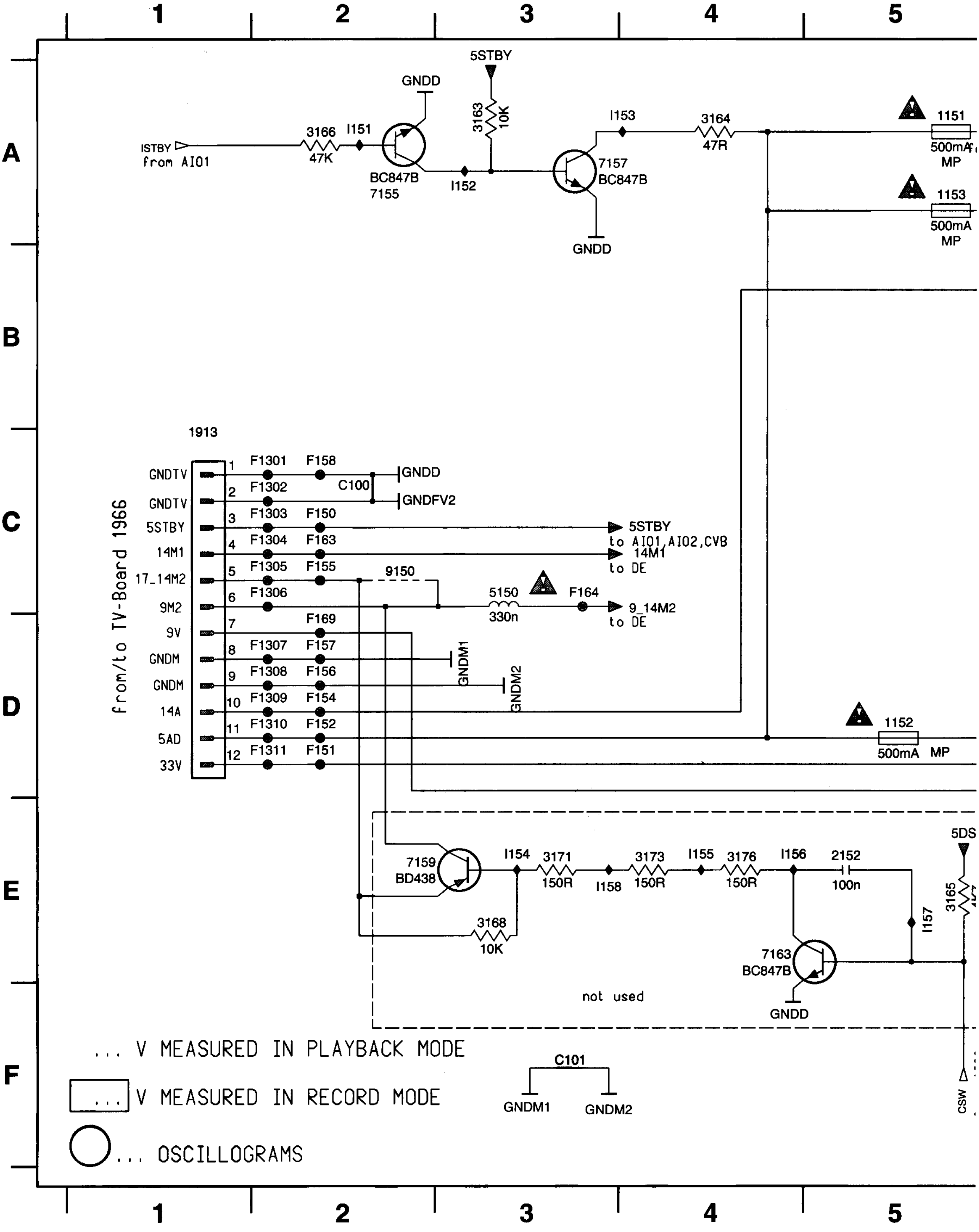

1
2
3
4
5
A
B
C
D
E
F
MUTE_PST to I01
ASTB to AMP
VOL to AMP
RAB to SF
ITREBLE to SF
IBASS to SF
RAD to SF
SB1_1 to TU1
TU1A_B to TU1
AGC1 from TU1
8SC1 from IO_1
SCO1 to IO_1
SCO2 to IO_1
VS2 to SF
VS1 to SF
RGBON to TV
VTV fromTV
VPDC from IO_1
5DS
3802 1K
5STBY
3805 2K2
3808 4K7
PDTC124ET 7803
0V
7802 PDTC124ET
5DS
3803 4K7
3,6V
3804 10K
2,4V
GNDTXT
PSS1
3839
I867
0,7V
2800 not used
delete for STEREO
PMBT2369 7800
I868
0,7V
3810 10K
I812
I872
3807 100R for RADIO only
I873
2802 not used
for RADIO only
for SOUND_FEATURE only
3801 47K
I876
3816 1K
I823
3821 1K
I877
3827 100K
U315
7804
PAINTER ASSY
P2-0ITPWM
P2-1IPWM0
P2-2IPWM1
P2-3IPWM2
P2-4IPWM3
P2-5IPWM4
P2-6IPWM5
P2-7IPWM6
P3-0IADC0
P3-1IADC1
P3-2IADC2
P3-3IADC3
VSSC
P0-0
P0-1
P0-2
P0-3
P0-4
P0-5
P0-6
P0-7
VSSA
CVBS0
CVBS1
SYNC-FILTER
IREF
P1-5ISDA1
P1-4ISCL1
P1-7ISDA0
P1-6ISCL0
P1-3IT1
P1-2IINT0
P1-1IT0
P1-0IINT1
VDDP
RESET
XTALOUT
XTALIN
OSCGND
VDDC
VSSP
VSYNC
HSYNC
VDS
R
G
B
VDDA
P3-4IPWM7
CORB
VPE
FRAME
I813
I814
I815
I816
I817
I818
I819
I820
F802
I824
I827
I850
I851
I825
I886
I826
I830
I831
I832
I833
I834
I835
I843
2,3V
3,3V
3,3V
0V
0V
5,1V
3,7V
2,5V
0V
0V
0V
0V
0V
5,2V
1V
0,2V
0,7V
1,2V
3,6V
5,1V
5,2V
3,3V
5,1V
3,3V
0,2V
1,7V
1,6V
0V
3,3V
0,1V
0,3V
3,3V
5STBY
5STBY
5DS
5DS
5DS
5DS
3822 47K
3829 47K
3820 10K
3825 47K
3843 47K
3846 47K
I800
3831 1K
I801
3832 100K
I802
3834 1K
3835 1K
3837 10K
3864 10K
7807 PDTC124ET
2,4V
I821
7808 PDTC124ET
2,4V
I822
3844 100K
3841 100K
I879
3809 100R
I805
2813 100n
I806
2815 100n
I807
I808
I809
3858 10K
3850 24K 1%
2816 100n
4800 for TU2 or TU2MONO only
2814
...V MEASURED IN PLAYBACK MODE
...V MEASURED IN RECORD MODE
OSCILLOGRAMS

	Interconnections													
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

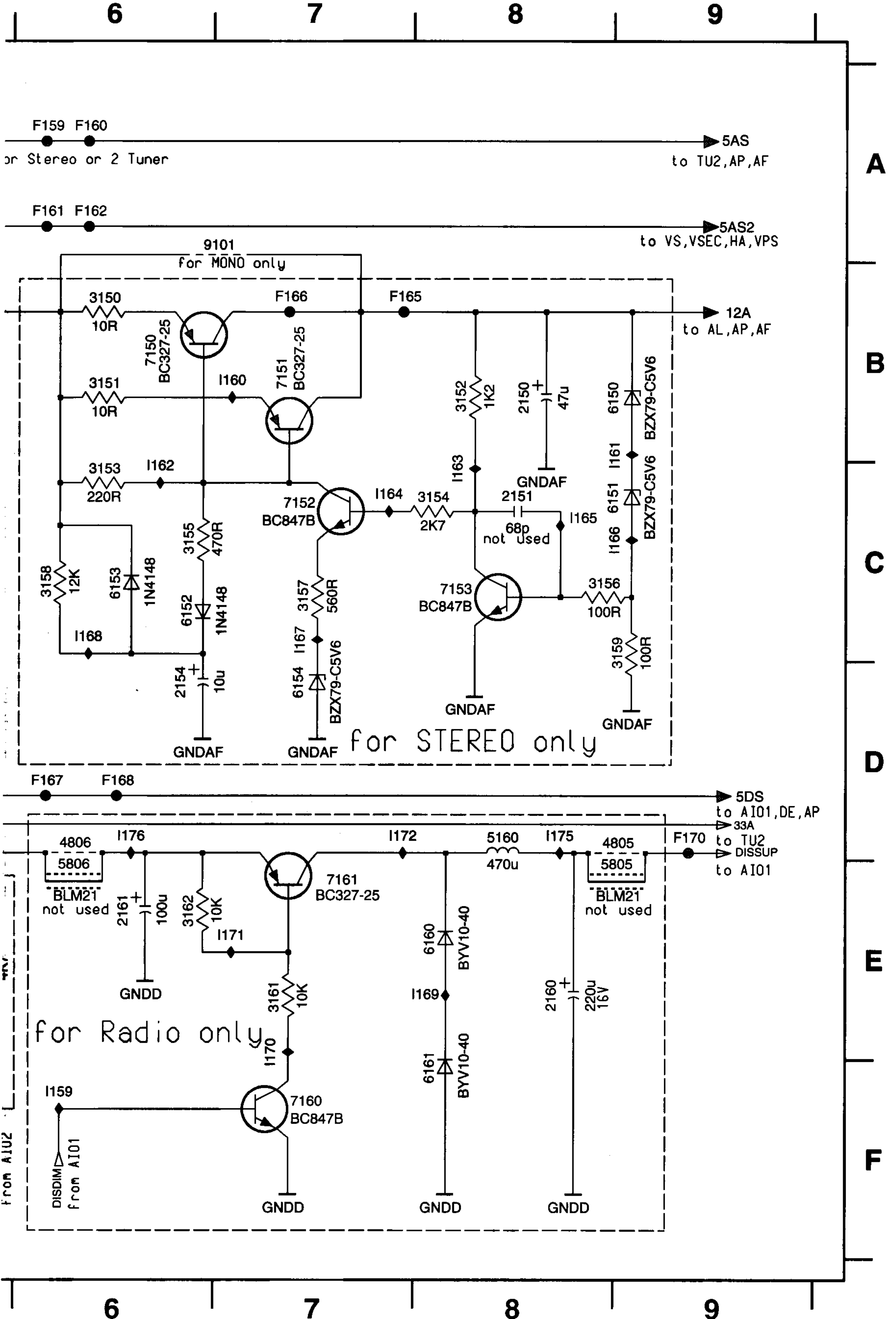

6
7
8
9
A
B
C
D
E
F
to TU1
5DS
5DS
MNT1 to TU1
5STBY
SDA0 from/to TU1,TV,IO_1
SCL0 to TU1,TV,IO_1
from TV 8TVB1
from PS 5DS
from PS 3V3
from PS 5STBY
7801
M24C01
5,2V
8
VCC
E0
E1
E2
SCL
WC_
VSS
SDA
5,2V
2820 100n
GNDTXT
3826 10K
3860 100K
3859 47K
I847
5,1V
I846
3815 100R
3814 100R
2803 not used
2804 not used
ISTBY to PS
DIG.INTERFACE
1962
F6201 SCL0 5,1V
F6202 GND
F6203 SDA0 5,1V
F6204 ITXTINTCO 1V
F6205 ISTBY 4,6V
F6206 TXTRESET 0,2V
F6207 AMT 5,2V
F6208 SCL1 0V
F6209 GND
F6210 SDA1 5,2V
PH-B
from/to RUB (AI01) Connector 1980
I839
3819 100R
3818 100R
3V3
2806 not used
2807 not used
3V3
5DS
3823 3K3
5803 BLM21
3861 10K
I841
3828 100R
2809 100n
2821 220n
AMT to SP
1963 12M
2810 56p
2811 56p
3V3
5802 BLM21
2812 100n
3838 1K
I840
VGUARD from TV
3845 1K5
3836 100K
3849 820R
8TVB1
7806 BC547B
8V
I838
3847 100R
HFB from TV
0,6V
I842
1V
5801 BLM21
3V3
100n
4801
4803
4802
BLTXT
RTXT
GTXT
BTXT
to TV
30
31
32
0800 HEATSINK 3139 121 2653
3851 82R 1%
2817 not used
3852 82R 1%
2818 not used
3853 82R 1%
2819 not used
GNDTXT

0800	F6
1962	B9
1963	D6
2800	A3
2802	B1
2803	B8
2804	B8
2806	B6
2807	B7
2809	C7
2810	D6
2811	D6
2812	D7
2813	E1
2814	E5
2815	E2
2816	F3
2817	F7
2818	F8
2819	F9
2820	A7
2821	D8
3801	B2
3802	A2
3803	A4
3804	A5
3805	A4
3807	B2
3808	A4
3809	E1
3810	B3
3814	B7
3815	B8
3816	B1
3818	B6
3819	B5
3820	C2
3821	C2
3822	C1
3823	C6
3825	C2
3826	A5
3827	C2
3828	C7
3829	C1
3831	C1
3832	D1
3834	D1
3835	D1
3836	D9
3837	D2
3838	D9
3839	B5
3841	E1
3843	C2
3844	E2
3845	D7
3846	C2
3847	E9
3849	E7
3850	F3
3851	F7
3852	F8
3853	F8
3858	E3
3859	B6
3860	A6
3861	C8
3864	D2
4800	F2
4801	E6
4802	E7
4803	E6
5801	E6
5802	D7
5803	C7
7800	B3
7801	A7
7802	A4
7803	A5
7804	B4
7806	E8
7807	D1
7808	E1
F6201	B9
F6202	B9
F6203	B9
F6204	B9
F6205	B9
F6206	C
F6207	C
F6208	C
F6209	C
F6210	C
F802	D3
I800	C1
I801	C1
I802	D1
I805	E1
I806	E3
I807	E3
I808	E3
I809	F3
I812	B3
I813	B3
I814	B3
I815	C3
I816	C3
I817	C3
I818	C3
I819	C3
I820	D3
I821	D1
I822	E2
I823	B1
I824	D3
I825	C5
I826	C5
I827	D3
I830	D5
I831	D5
I832	D5
I833	D5
I834	E5
I835	E5
I838	E9
I839	B5
I840	D9
I841	C6
I842	E8
I843	E5
I846	A8
I847	A7
I850	B5
I851	B5
I867	A3
I868	B3
I872	B1
I873	B3
I876	B1
I877	C1
I879	E1
I886	C5
U315	C3

Power Supply (PS) - Recorder Unit Board (RUBAD)

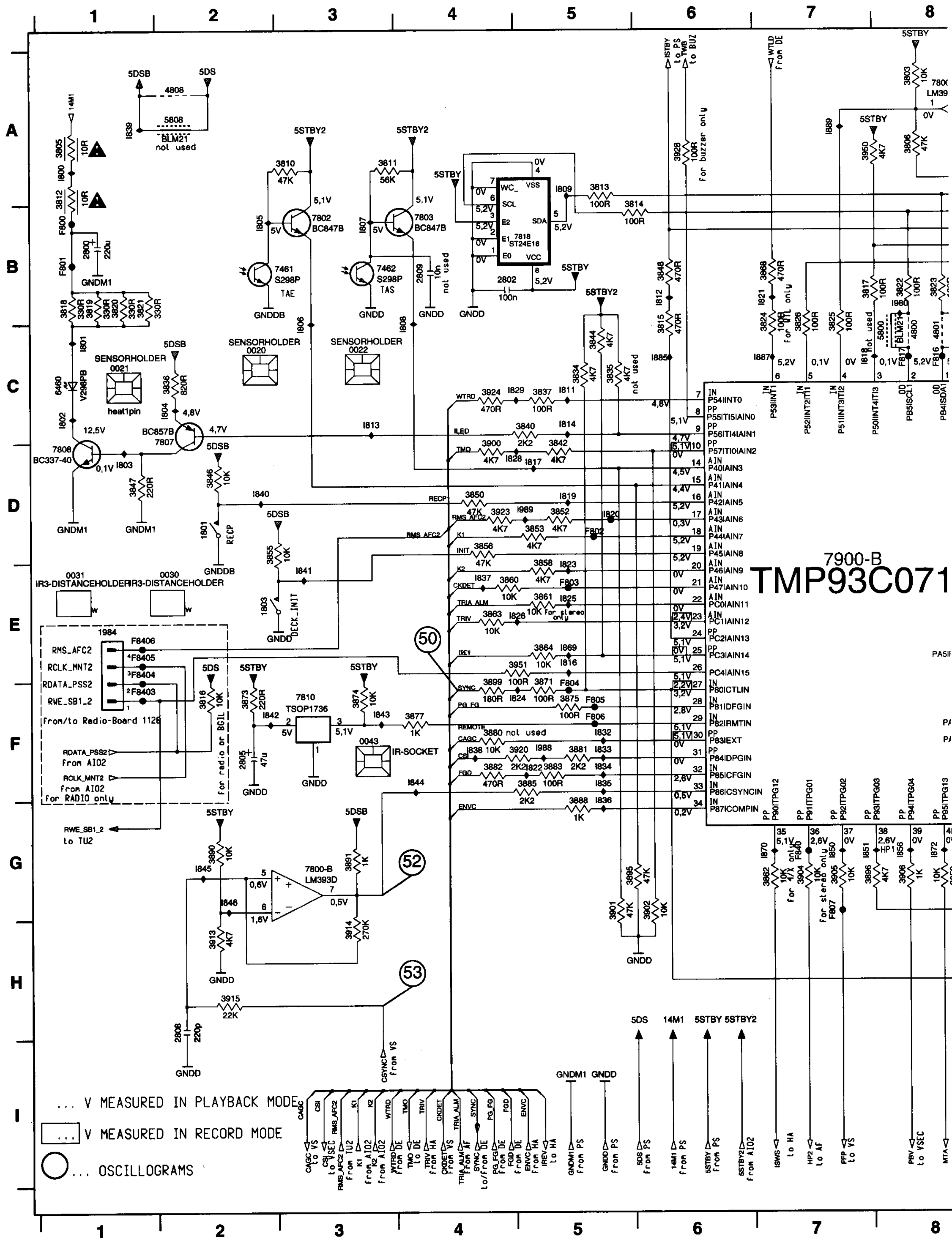

1
2
3
4
5
A
B
C
D
E
F
5STBY
GNDD
3163
10K
I153
3164
47R
1151
500mA
MP
1153
500mA
MP
ISTBY
from AI01
3166
47K
I151
BC847B
7155
I152
7157
BC847B
GNDD
1913
from/to TV-Board 1966
GNDTV
GNDTV
5STBY
14M1
17_14M2
9M2
9V
GNDM
GNDM
14A
5AD
33V
1
2
3
4
5
6
7
8
9
10
11
12
F1301
F1302
F1303
F1304
F1305
F1306
F1307
F1308
F1309
F1310
F1311
F158
F150
F163
F155
F169
F157
F156
F154
F152
F151
C100
GNDD
GNDFV2
5STBY
to AI01,AI02,CVB
14M1
to DE
9150
5150
330n
F164
9_14M2
to DE
GNDM1
GNDM2
1152
500mA MP
7159
BD438
I154
3171
150R
I158
3173
150R
I155
3176
150R
I156
2152
100n
5DS
3165
I157
3168
10K
7163
BC847B
GNDD
not used
CSW
C101
GNDM1
GNDM2
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
... OSCILLOGRAMS

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	


6
7
8
9
A
B
C
D
E
F
F159
F160
or Stereo or 2 Tuner
5AS
to TU2,AP,AF
F161
F162
5AS2
to VS,VSEC,HA,VPS
9101
for MONO only
3150
10R
F166
F165
12A
to AL,AP,AF
7150
BC327-25
7151
BC327-25
3151
10R
I160
3152
1K2
2150
47u
6150
BZX79-C5V6
I161
6151
BZX79-C5V6
I163
GNDAF
3153
220R
I162
7152
BC847B
I164
3154
2K7
2151
68p
not used
I165
I166
3155
470R
3158
12K
6153
1N4148
6152
1N4148
3157
560R
7153
BC847B
3156
100R
I168
I167
6154
BZX79-C5V6
3159
100R
2154
10u
GNDAF
GNDAF
GNDAF
GNDAF
for STEREO only
F167
F168
5DS
to AI01,DE,AP
33A
to TU2
DISSUP
to AI01
4806
5806
BLM21
not used
I176
2161
100u
3162
10K
I171
7161
BC327-25
I172
5160
470u
I175
4805
5805
BLM21
not used
F170
6160
BYV10-40
I169
6161
BYV10-40
2160
220u
16V
GNDD
3161
10K
for Radio only
I170
I159
7160
BC847B
DISDIM
from AI01
from AI02
GNDD
GNDD
GNDD

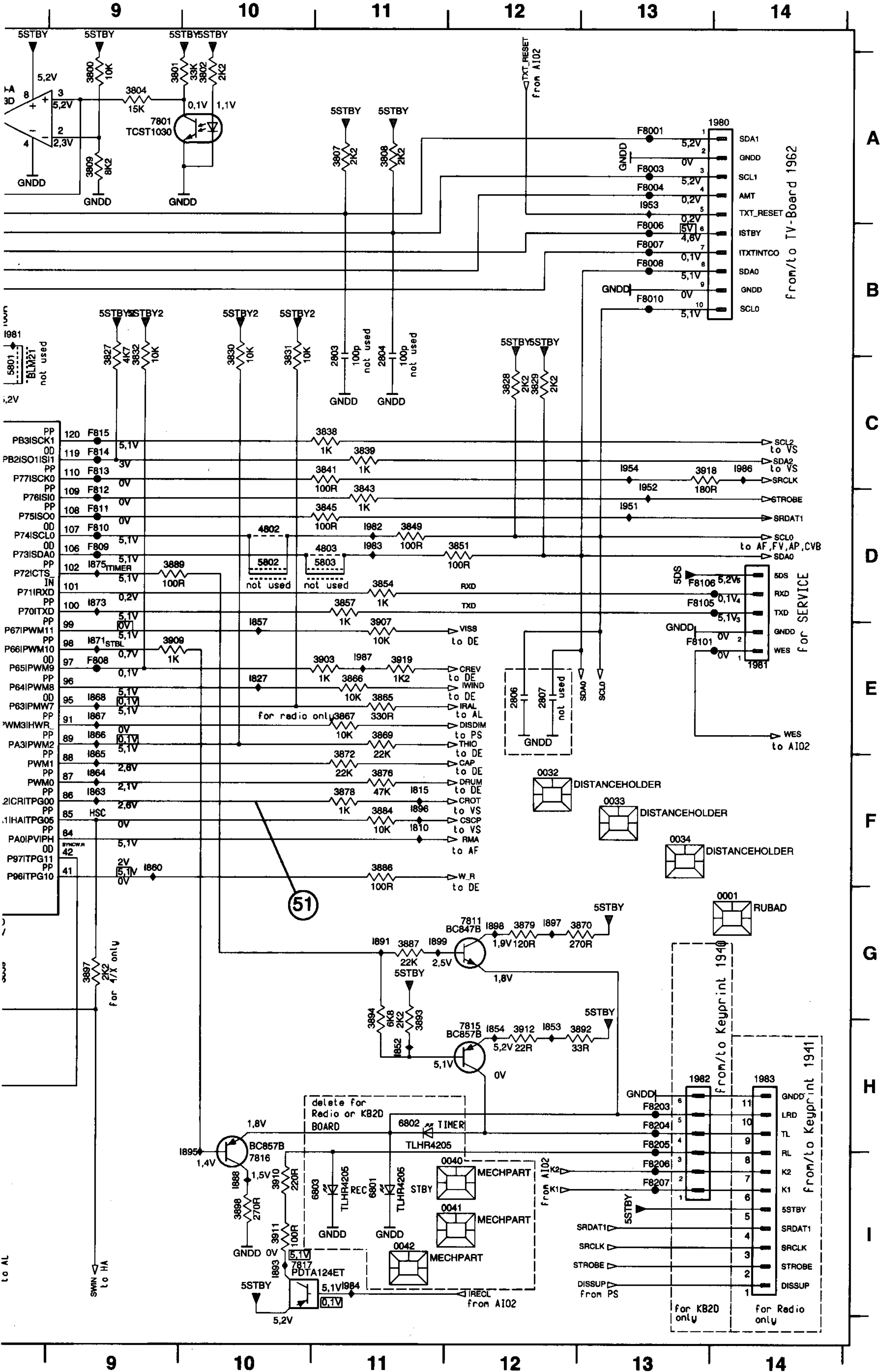
1151	A5
1152	D5
1153	A5
1913	C1
2150	B8
2151	C8
2152	E5
2154	D6
2160	E8
2161	E6
3150	B6
3151	B6
3152	B8
3153	C6
3154	C8
3155	C6
3156	C8
3157	C7
3158	C6
3159	C9
3161	E7
3162	E6
3163	A3
3164	A4
3165	E5
3166	A2
3168	E3
3171	E3
3173	E4
3176	E4
4805	D9
4806	D6
5150	C3
5160	D8
5805	E9
5806	E6
6150	B9
6151	C9
6152	C6
6153	C6
6154	D7
6160	E8
6161	F8
7150	B6
7151	B7
7152	C7
7153	C8
7155	A2
7157	A3
7159	E3
7160	F7
7161	E7
7163	E4
9101	A7
9150	C2
C100	C2
C101	F3
F1301	C2
F1302	C2
F1303	C2
F1304	C2
F1305	C2
F1306	C2
F1307	D2
F1308	D2
F1309	D2
F1310	D2
F1311	D2
F150	C2
F151	D2
F152	D2
F154	D2
F155	C2
F156	D2
F157	D2
F158	C2
F159	A6
F160	A6
F161	A6
F162	A6
F163	C2
F164	C3
F165	B7
F166	B7
F167	D6
F168	D6
F169	D2
F170	D9
I151	A2
I152	A3
I153	A4
I154	E3
I155	E4
I156	E4
I157	E5
I158	E3
I159	F6
I160	B7
I161	B8
I162	C6
I163	C8
I164	C7
I165	C8
I166	C8
I167	C7
I168	C6
I169	E8
I170	E7
I171	E7
I172	D7
I175	D8
I176	D6

Central Control 1 (AIO1) - Recorder Unit Board (RUBAD)


1 2 3 4 5 6 7 8
A B C D E F G H I
7900-B
TMP93C071
7818 ST24E16
7802 BC847B
7803 BC847B
7461 S298P TAE
7462 S298P TAS
7807 BC857B
7808 BC337-40
6460 V298PB
7810 TSOP1736
7800-B LM393D
SENSORHOLDER 0021 heat1pin
SENSORHOLDER 0020
SENSORHOLDER 0022
0031 IR3-DISTANCEHOLDER
0030 IR3-DISTANCEHOLDER
0043 IR-SOCKET
BLM21 not used
1984
RMS_AFC2
RCLK_MNT2
RDATA_PSS2
RWE_SB1_2
from/to Radio-Board 1126
RDATA_PSS2 from AIO2
RCLK_MNT2 from AIO2
for RADIO only
RWE_SB1_2 to TU2
for radio or BCIL
RECP
DECK_INIT
CSYNC from VS
ISTBY to PS
TWB to BUZ
for buzzer only
WTLD from DE
5DS 14M1 5STBY 5STBY2
GNDM1 GNDD
(50)
(52)
(53)
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
... OSCILLOGRAMS
CAGC to VS
CSI to VSEC
RMS_AFC2 from TU2
K1 from AIO2
K2 from AIO2
WTRD from DE
TMO to DE
TRIV from HA
CKDET to VS
TRIA_ALM from AF
SYNC to/from DE
PG_FG from DE
FGD from DE
ENVC from HA
IREV to HA
GNDM1 from PS
GNDD from PS
5DS from PS
14M1 from PS
5STBY from PS
5STBY2 from AIO2
ISWS to HA
HP2 to AF
FFP to VS
PBV to VSEC

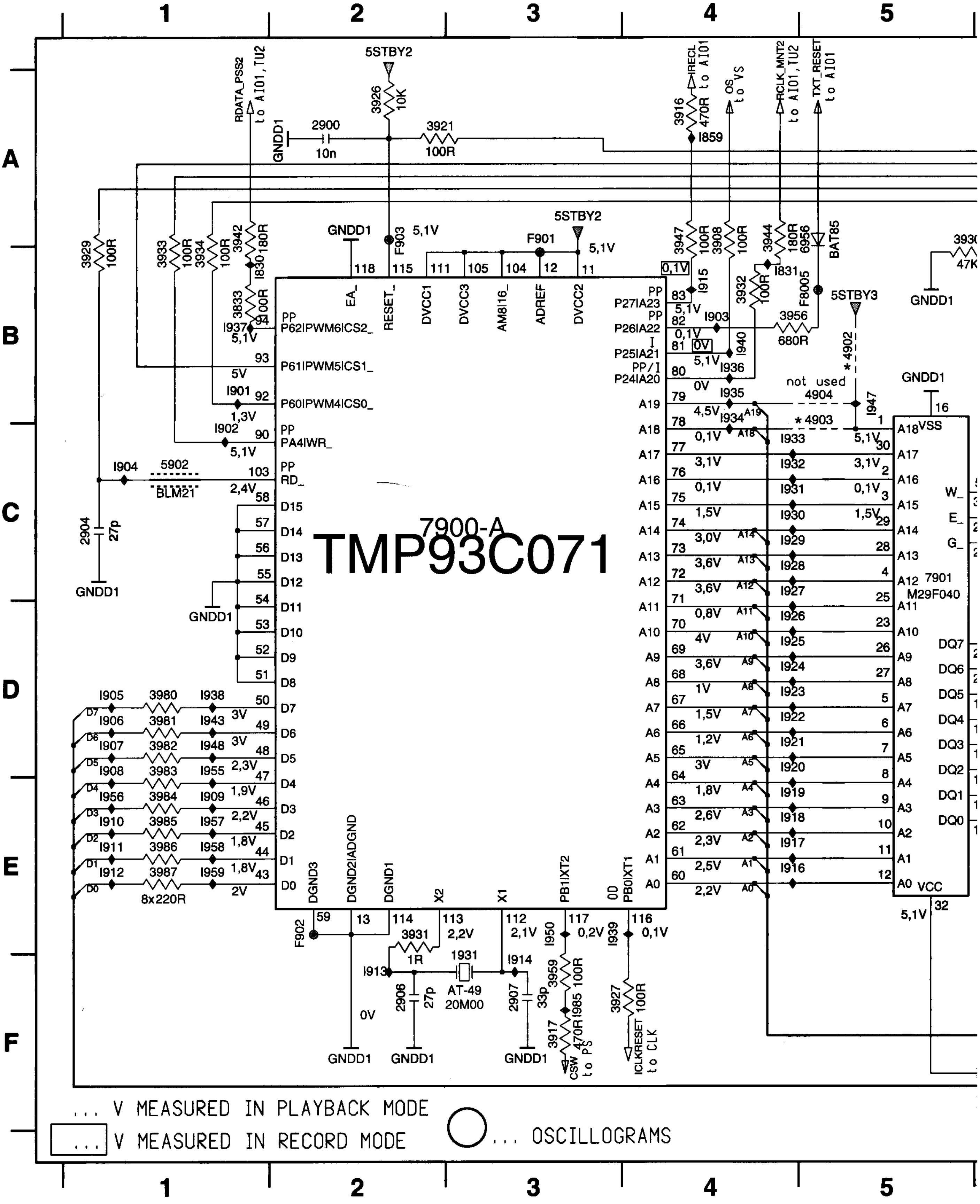
Interconnections

Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	


9
10
11
12
13
14
A
B
C
D
E
F
G
H
I
5STBY
5,2V
8
3
5,2V
2
2,3V
4
GNDD
3800 10K
3809 8K2
3804 15K
3801 33K
3802 2K2
0,1V
1,1V
7801
TCST1030
TXT_RESET from AI02
3807 2K2
3808 2K2
1980
F8001
5,2V
SDA1
GNDD
0V
F8003
5,2V
SCL1
F8004
0,2V
AMT
I953
0,2V
TXT_RESET
F8006
5V
4,6V
ISTBY
F8007
0,1V
ITXTINTCO
F8008
5,1V
SDA0
GNDD
0V
F8010
5,1V
SCL0
from/to TV-Board 1962
5STBY2
I981
5801 "BLM21" not used
3827 4K7
3832 10K
3830 10K
3831 10K
2803 100p not used
2804 100p not used
3828 2K2
3829 2K2
PB3ISCK1
PB2ISO1ISI1
P77ISCK0
P76ISI0
P75ISO0
P74ISCL0
P73ISDA0
P72ICTS_
P71IRXD
P70ITXD
P67IPWM11
P66IPWM10
P65IPWM9
P64IPWM8
P63IPWM7
PWM3IHWR_
PA3IPWM2
PWM1
PWM0
P97ITPG11
P96ITPG10
F815
F814
F813
F812
F811
F810
F809
F808
I875 ITIMER
I873
I871 STBL
I868
I867
I866
I865
I864
I863
HSC
I860
3838 1K
3839 1K
3841 100R
3843 1K
3845 100R
3849 100R
3851 100R
3854 1K
3857 1K
3889 100R
3907 10K
3909 1K
3903 1K
3919 1K2
3866 10K
3865 330R
3867 10K
3869 22K
3872 22K
3876 47K
3878 1K
3884 10K
3886 100R
3918 180R
4802
4803
5802 not used
5803 not used
I982
I983
I954
I952
I951
I986
I857
I827
I987
I815
I896
I810
SCL2 to VS
SDA2 to VS
SRCLK
STROBE
SRDAT1
SCL0
to AF,FV,AP,CVB
SDA0
RXD
TXD
VISS to DE
CREV to DE
IWIND to DE
IRAL to AL
DISDIM to PS
THIO to DE
CAP to DE
DRUM to DE
CROT to VS
CSCP to VS
RMA to AF
W_R to DE
for radio only
5DS
F8106
F8105
F8101
5,2V
0,1V
5,1V
0V
5DS
RXD
TXD
GNDD
WES
1981
for SERVICE
WES to AI02
2806
2807 not used
SDA0
SCL0
0032 DISTANCEHOLDER
0033 DISTANCEHOLDER
0034 DISTANCEHOLDER
0001 RUBAD
(51)
3897 2K2 for 4/X only
SWIN to HA
7811 BC847B
I891
3887 22K
I899
2,5V
I898
1,9V
3879 120R
I897
3870 270R
1,8V
3894 6K8
3893 2K2
7815 BC857B
I852
5,1V
I854
3912 22R
5,2V
I853
3892 33R
0V
7816 BC857B
I895
1,4V
1,8V
1,5V
I888
3898 270R
3910 220R
3911 100R
7817 PDTA124ET
I893
I984
5,1V
0,1V
5,2V
IRECL from AI02
delete for Radio or KB2D BOARD
6802 TIMER TLHR4205
6803 TLHR4205 REC
6801 TLHR4205 STBY
0040 MECHPART
0041 MECHPART
0042 MECHPART
from AI02 K2 K1
1982
1983
GNDD
F8203
F8204
F8205
F8206
F8207
5STBY
SRDAT1
SRCLK
STROBE
DISSUP from PS
GNDD
LRD
TL
RL
K2
K1
5STBY
SRDAT1
SRCLK
STROBE
DISSUP
from/to Keyprint 1940
from/to Keyprint 1941
for KB2D only
for Radio only

0001	G14
0020	C2
0021	C1
0022	C3
0030	E2
0031	E1
0032	F12
0033	F13
0034	F13
0040	I11
0041	I11
0042	I11
0043	F3
1801	D2
1803	E2
1980	A13
1981	E14
1982	H13
1983	H14
1984	E1
2800	B1
2802	B4
2803	C11
2804	C11
2805	F2
2806	E12
2807	E12
2808	H2
2809	B4
3800	A9
3801	A9
3802	A10
3803	A8
3804	A9
3805	A1
3806	A8
3807	A11
3808	A11
3809	A9
3810	A3
3811	A3
3812	A1
3813	A5
3814	B6
3815	C6
3816	F2
3817	B7
3818	B1
3819	B1
3820	B1
3821	B1
3822	B8
3823	B8
3824	C7
3825	C7
3826	C7
3827	C9
3828	C12
3829	C12
3830	C10
3831	C10
3832	C9
3834	C5
3835	C5
3836	C2
3837	C5
3838	C11
3839	C11
3840	C5
3841	C11
3842	D5
3843	D11
3844	C5
3845	D11
3846	D2
3847	D1
3848	B6
3849	D11
3850	D4
3851	D12
3852	D5
3853	D5
3854	D11
3855	D2
3856	D4
3857	D11
3858	E5
3859	G8
3860	E4
3861	E5
3862	G7
3863	E4
3864	E5
3865	E11
3866	E11
3867	E11
3868	B7
3869	E11
3870	G13
3871	F5
3872	F11
3873	F2
3874	F3
3875	F5
3876	F11
3877	F4
3878	F11
3879	G12
3880	F4
3881	F5
3882	F4
3883	F5
3884	F11
3885	F5
3886	F11
3887	G11
3888	G5
3889	D9
3890	G2
3891	G3
3892	H13
3893	H11
3894	H11
3895	G5
3896	G7
3897	G9
3898	I10
3899	F4
3900	D4
3901	G5
3902	G6
3903	E11
3904	G7
3905	G7
3906	G8
3907	E11
3909	E9
3910	I10
3911	I10
3912	H12
3913	H2
3914	H3
3915	H2
3918	C13
3919	E11
3920	F5
3923	D4
3924	C4
3928	A6
3950	A7
3951	E5
4800	C8
4801	C8
4802	D10
4803	D11
4808	A2
5800	C8
5801	C8
5802	D10
5803	D11
5808	A2
6460	C1
6801	I11
6802	H11
6803	I11
7461	B2
7462	B3
7800-A	A8
7800-B	G3
7801	A9
7802	B3
7803	B4
7807	C2
7808	D1
7810	F3
7811	G12
7815	H12
7816	I10
7817	I11
7818	B5
7900-B	E7
F800	B1
F8001	A13
F8003	A13
F8004	A13
F8006	B13
F8007	B13
F8008	B13
F801	B1
F8010	B13
F802	D5
F803	E5
F804	F5
F805	F5
F806	F5
F807	G7
F808	E9
F809	D9
F810	D9
F8101	E13
F8105	D13
F8106	D13
F811	D9
F812	D9
F813	C9
F814	C9
F815	C9
F816	C8
F817	C8
F8203	H13
F8204	H13
F8205	H13
F8206	I13
F8207	I13
F840	G7
F8403	F1
F8404	E1
F8405	E1
F8406	E1
I800	A1
I801	C1
I802	C1
I803	D1
I804	C2
I805	B2
I806	C3
I807	B3
I808	C4
I809	A5
I810	F11
I811	C5
I812	B6
I813	C3
I814	C5
I815	F11
I816	E5
I817	D5
I818	C7
I819	D5
I820	D5
I821	B7
I822	F5
I823	E5
I824	F5
I825	E5
I826	E5
I827	E10
I828	D4
I829	C5
I832	F5
I833	F5
I834	F5
I835	F5
I836	G5
I837	E4
I838	F4
I839	A1
I840	D2
I841	E3
I842	F2
I843	F3
I844	F4
I845	G2
I846	G2
I850	G7
I851	G7
I852	H11
I853	H12
I854	H12
I856	G8
I857	E10
I860	F9
I863	F9
I864	F9
I865	F9
I866	E9
I867	E9
I868	E9
I869	E5
I870	G7
I871	E9
I872	G8
I873	D9
I875	D9
I885	C6
I887	C7
I888	I10
I889	A7
I891	G11
I893	I10
I895	I10
I896	F11
I897	G12
I898	G12
I899	G11
I951	D13
I952	C13
I953	A13
I954	C13
I980	B8
I981	B8
I982	D11
I983	D11
I984	I11
I986	C14
I987	E11
I988	F5
I989	D5

Central Control 2 (AIO2) - Recorder Unit Board (RUBAD)

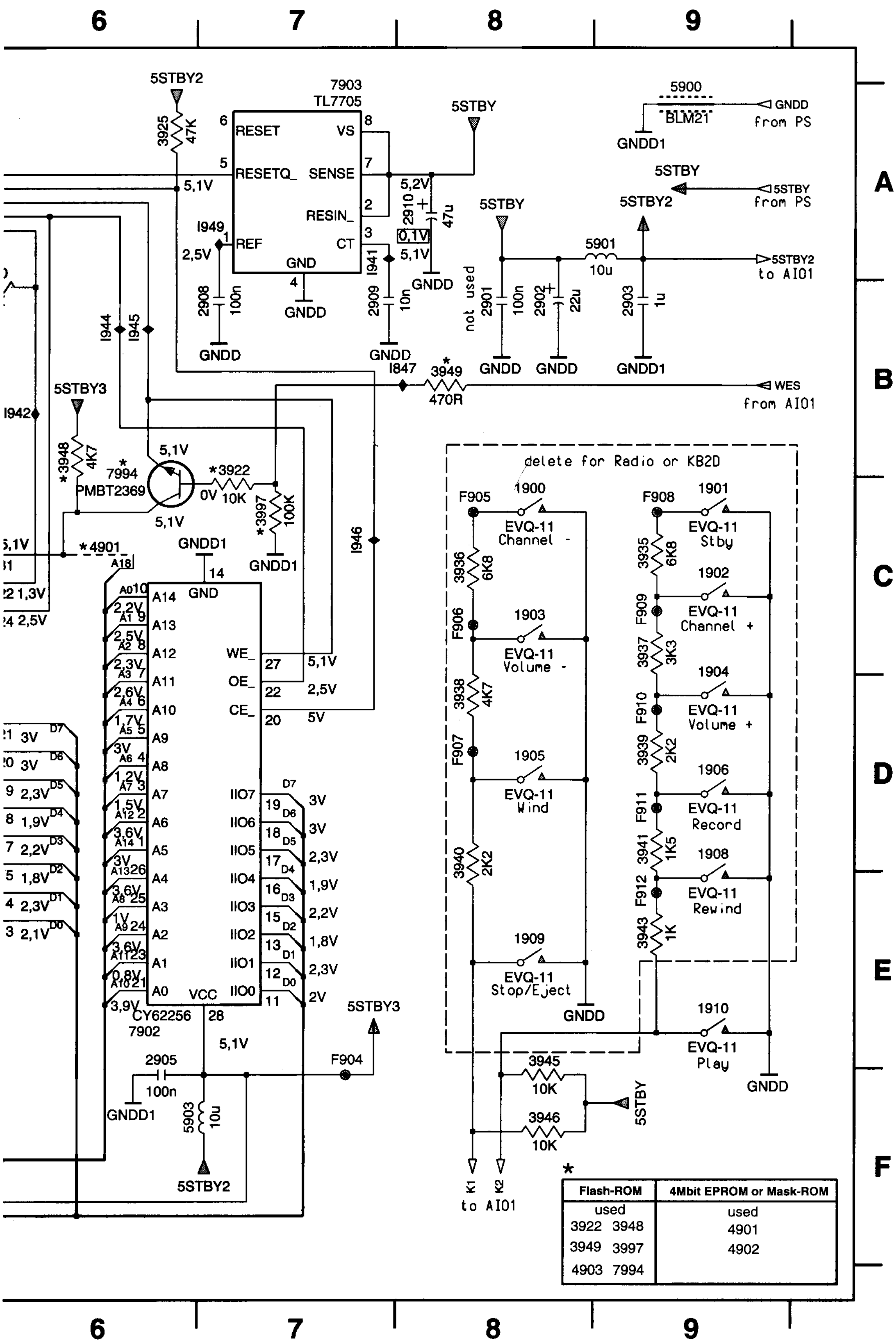

1
2
3
4
5
A
B
C
D
E
F
7900-A
TMP93C071
7901
M29F040
5STBY2
5STBY3
GNDD1
RDATA_PSS2 to AIO1,TU2
RECL to AIO1
OS to VS
RCLK_MNT2 to AIO1,TU2
TXT_RESET to AIO1
CSW to PS
ICLKRESET to CLK
2900 10n
3926 10K
3921 100R
3916 470R
I859
3947 100R
3908 100R
3944 180R
6956 BAT85
3932 100R
3956 680R
F8005
I831
I915
I903
I940
I936
I935
I934
3929 100R
3933 100R
3934 100R
3942 180R
3833 100R
I830
I937
I901
I902
I904
5902 BLM21
2904 27p
F903
F901
F902
118 EA_
115 RESET_
111 DVCC1
105 DVCC3
104 AM8I16_
12 ADREF
11 DVCC2
94 P62IPWM6ICS2_
93 P61IPWM5ICS1_
92 P60IPWM4ICS0_
90 PA4IWR_
103 RD_
83 P27IA23
82 P26IA22
81 P25IA21
80 P24IA20
79 A19
78 A18
D15 D14 D13 D12 D11 D10 D9 D8
D7 D6 D5 D4 D3 D2 D1 D0
A17 A16 A15 A14 A13 A12 A11 A10 A9 A8 A7 A6 A5 A4 A3 A2 A1 A0
59 DGND3
13 DGND2IADGND
114 DGND1
113 X2
112 X1
117 PB1IXT2
116 PB0IXT1
3980 3981 3982 3983 3984 3985 3986 3987 8x220R
I905 I906 I907 I908 I956 I910 I911 I912
I938 I943 I948 I955 I909 I957 I958 I959
I916 I917 I918 I919 I920 I921 I922 I923 I924 I925 I926 I927 I928 I929 I930 I931 I932 I933
not used 4904
*4903
*4902
I947
3931 1R
1931 AT-49 20M00
I913
I914
2906 27p
2907 33p
I950
I939
3959 100R
I985
3917 470R
3927 100R
16 VSS
32 VCC
W_
E_
G_
DQ7 DQ6 DQ5 DQ4 DQ3 DQ2 DQ1 DQ0
3930 47K
5,1V
0,1V
0V
2,2V
2,1V
0,2V

... V MEASURED IN PLAYBACK MODE

... V MEASURED IN RECORD MODE

... OSCILLOGRAMS

Interconnections															
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

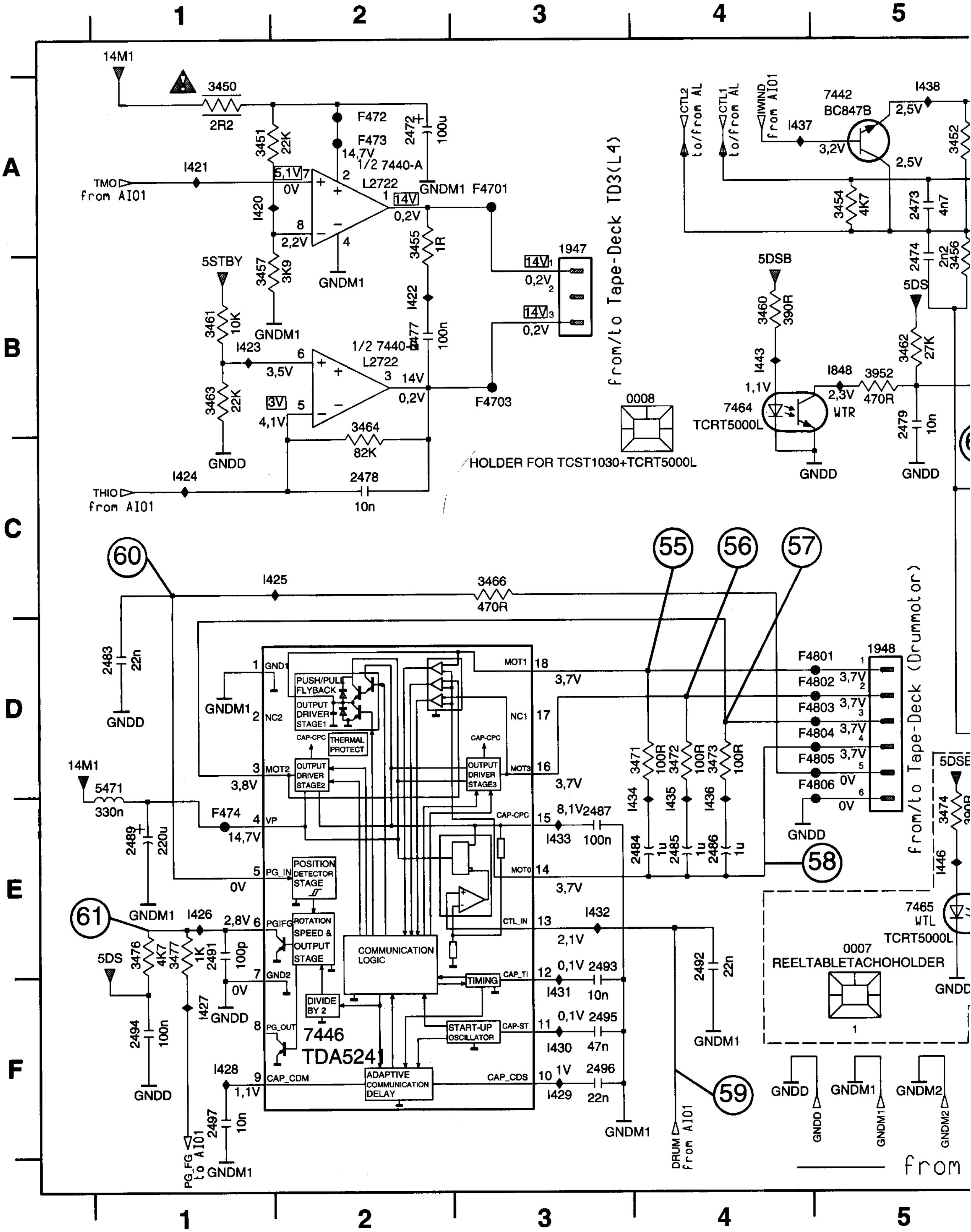

6
7
8
9
A
B
C
D
E
F
5STBY2
3925
47K
7903
TL7705
RESET
VS
RESETQ_
SENSE
RESIN_
REF
CT
GND
5,1V
I949
2,5V
2908
100n
GNDD
5STBY
5,2V
2910
47u
0,1V
I941
5,1V
2909
10n
5900
BLM21
GNDD
from PS
GNDD1
5STBY
5STBY
from PS
5STBY2
5901
10u
5STBY2
to AI01
not used
2901
100n
2902
22u
2903
1u
GNDD1
I944
I945
I847
3949
470R
WES
from AI01
5STBY3
I942
3948
4K7
7994
PMBT2369
5,1V
*3922
10K
0V
*3997
100K
GNDD1
*4901
A18
I946
A14
A13
A12
A11
A10
A9
A8
A7
A6
A5
A4
A3
A2
A1
A0
WE_
OE_
CE_
IIO7
IIO6
IIO5
IIO4
IIO3
IIO2
IIO1
IIO0
VCC
CY62256
7902
5,1V
2,5V
5V
3V
3V
2,3V
1,9V
2,2V
1,8V
2,3V
2V
5STBY3
F904
2905
100n
GNDD1
5903
10u
5STBY2
delete for Radio or KB2D
F905
1900
EVQ-11
Channel -
3936
6K8
F906
1903
EVQ-11
Volume -
3938
4K7
F907
1905
EVQ-11
Wind
3940
2K2
1909
EVQ-11
Stop/Eject
GNDD
F908
1901
EVQ-11
Stby
3935
6K8
F909
1902
EVQ-11
Channel +
3937
3K3
F910
1904
EVQ-11
Volume +
3939
2K2
F911
1906
EVQ-11
Record
3941
1K5
F912
1908
EVQ-11
Rewind
3943
1K
1910
EVQ-11
Play
GNDD
3945
10K
3946
10K
5STBY
K1
K2
to AI01

*

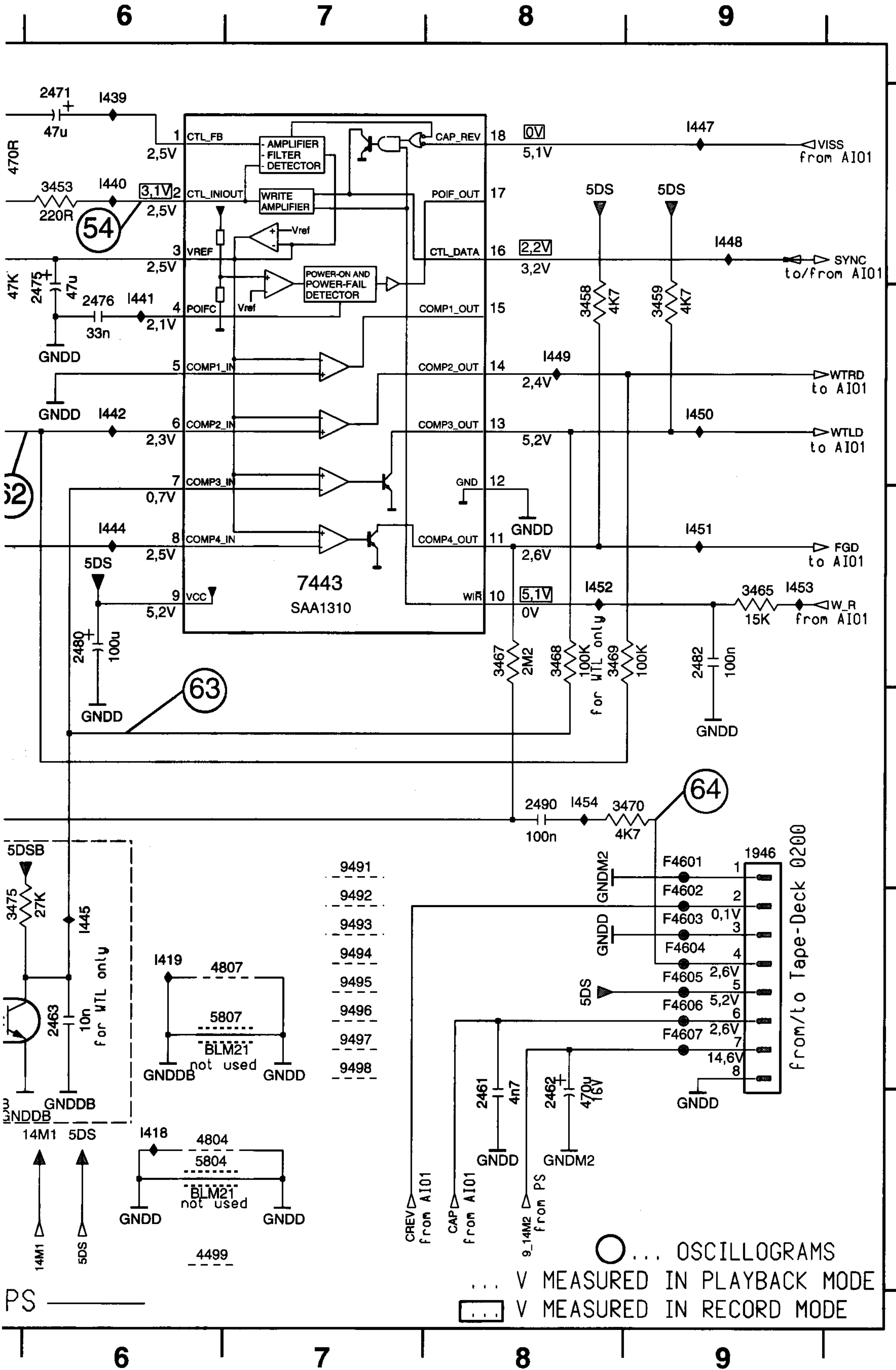
Flash-ROM	4Mbit EPROM or Mask-ROM
used	used
3922 3948	4901
3949 3997	4902
4903 7994	

1900	C8
1901	C9
1902	C9
1903	C8
1904	D9
1905	D8
1906	D9
1908	D9
1909	E8
1910	E9
1931	F3
2900	A2
2901	B8
2902	B8
2903	B9
2904	C1
2905	E6
2906	F2
2907	F3
2908	B7
2909	B7
2910	A8
3833	B1
3908	A4
3916	A4
3917	F3
3921	A2
3922	B7
3925	A6
3926	A2
3927	F3
3929	B1
3930	A5
3931	E2
3932	B4
3933	B1
3934	B1
3935	C9
3936	C8
3937	C9
3938	D8
3939	D9
3940	D8
3941	D9
3942	A1
3943	E9
3944	A4
3945	E8
3946	F8
3947	A4
3948	B6
3949	B8
3956	B4
3959	F3
3980	D1
3981	D1
3982	D1
3983	D1
3984	E1
3985	E1
3986	E1
3987	E1
3997	C7
4901	C6
4902	B5
4903	C5
4904	B5
5900	A9
5901	A9
5902	C1
5903	F6
6956	A5
7900-A	C2
7901	C5
7902	E6
7903	A7
7994	C6
F8005	B5
F901	A3
F902	E2
F903	A2
F904	E7
F905	C8
F906	C8
F907	D8
F908	C9
F909	C9
F910	D9
F911	D9
F912	E9
I830	B1
I831	B4
I847	B8
I859	A4
I901	B1
I902	C1
I903	B4
I904	C1
I905	D1
I906	D1
I907	D1
I908	D1
I909	E1
I910	E1
I911	E1
I912	E1
I913	F2
I914	F3
I915	B4
I916	E4
I917	E4
I918	E4
I919	E4
I920	D4
I921	D4
I922	D4
I923	D4
I924	D4
I925	D4
I926	D4
I927	C4
I928	C4
I929	C4
I930	C4
I931	C4
I932	C4
I933	C4
I934	B4
I935	B4
I936	B4
I937	B1
I938	D1
I939	E3
I940	B4
I941	A7
I942	B6
I943	D1
I944	B6
I945	B6
I946	C7
I947	B5
I948	D1
I949	A7
I950	E3
I955	D1
I956	E1
I957	E1
I958	E1
I959	E1
I985	F3

Deck Electronics (DE) - Recorder Unit Board (RUBAD)

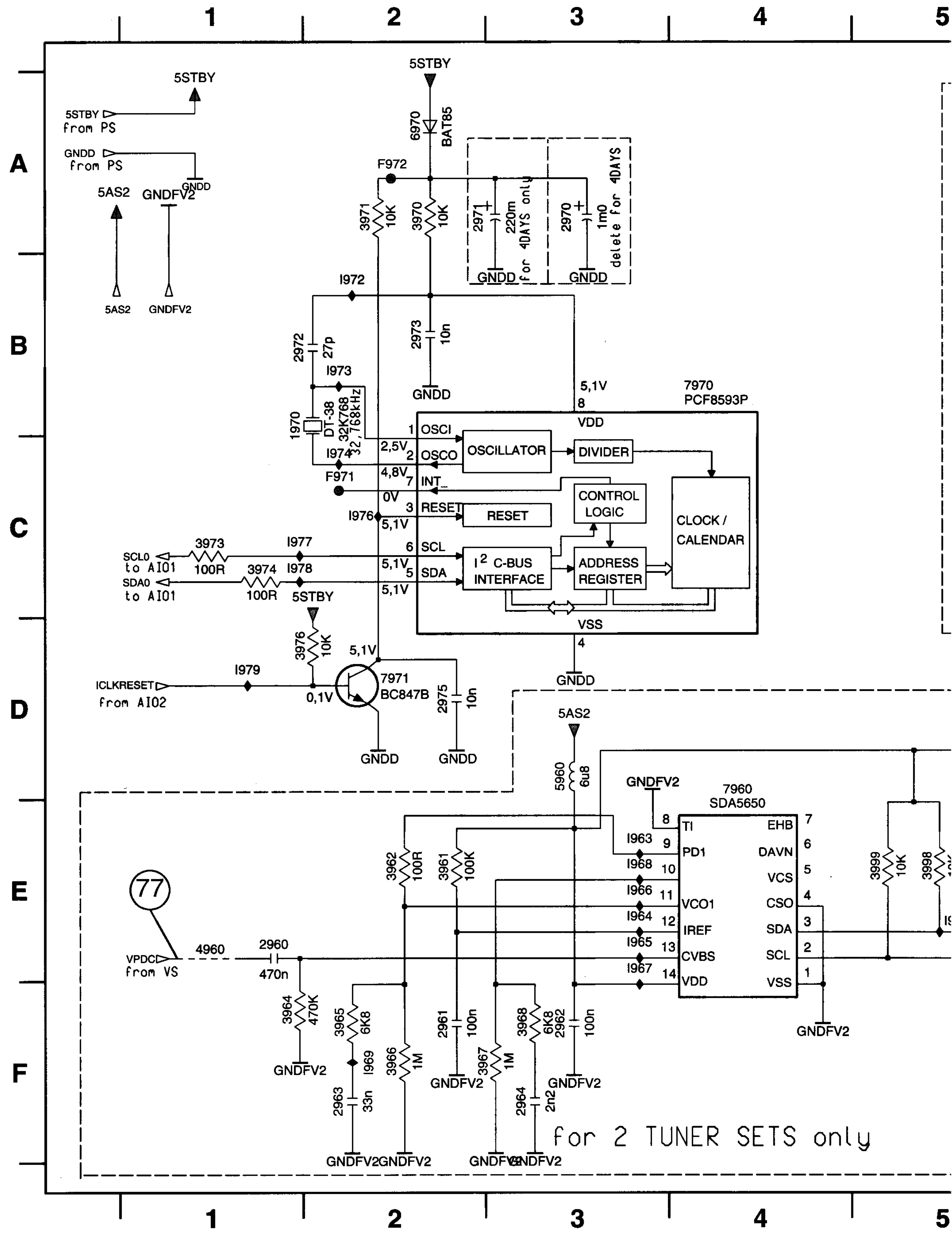

1
2
3
4
5
A
B
C
D
E
F
14M1
3450
2R2
3451
22K
F472
F473
14,7V
2472
100u
1/2 7440-A
L2722
GNDM1
F4701
TMO from AI01
I421
5,1V
0V
I420
2,2V
0,2V
14V
3455
1R
3457
3K9
GNDM1
5STBY
3461
10K
I423
3,5V
1/2 7440-B
3463
22K
3V
4,1V
3464
82K
GNDD
I422
2477
100n
F4703
1947
0,2V
from/to Tape-Deck TD3(L4)
0008
HOLDER FOR TCST1030+TCRT5000L
THIO from AI01
I424
2478
10n
CTL2 to/from AL
CTL1 to/from AL
IWIND from AI01
I437
7442
BC847B
I438
2,5V
3,2V
3452
3454
4K7
2473
4n7
2474
2n2
3456
5DSB
3460
390R
I443
1,1V
7464
TCRT5000L
I848
2,3V
WTR
3952
470R
5DS
3462
27K
2479
10n
GNDD
60
55
56
57
58
59
61
I425
3466
470R
2483
22n
7446
TDA5241
GND1
NC2
MOT2
VP
PG_IN
PGIFG
GND2
PG_OUT
CAP_CDM
MOT1
NC1
MOT3
CAP-CPC
MOT0
CTL_IN
CAP_TI
CAP-ST
CAP_CDS
PUSH/PULL FLYBACK
OUTPUT DRIVER STAGE1
THERMAL PROTECT
OUTPUT DRIVER STAGE2
OUTPUT DRIVER STAGE3
POSITION DETECTOR STAGE
ROTATION SPEED & OUTPUT STAGE
COMMUNICATION LOGIC
DIVIDE BY 2
TIMING
START-UP OSCILLATOR
ADAPTIVE COMMUNICATION DELAY
3,7V
3,8V
8,1V
2487
100n
I433
2,1V
I432
2492
22n
0,1V
2493
I431
2495
47n
I430
1V
2496
22n
I429
GNDM1
DRUM from AI01
3471
3472
3473
100R
I434
I435
I436
2484
2485
2486
1u
F4801
F4802
F4803
F4804
F4805
F4806
1948
from/to Tape-Deck (Drummotor)
14M1
5471
330n
2489
220u
F474
14,7V
5STBY
I426
2,8V
3476
4K7
3477
1K
2491
100p
I427
2494
100n
I428
1,1V
2497
10n
PG_FG to AI01
5DSB
3474
I446
7465
WTL
TCRT5000L
0007
REELTABLETACHOHOLDER
GNDD
GNDM1
GNDM2
from

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

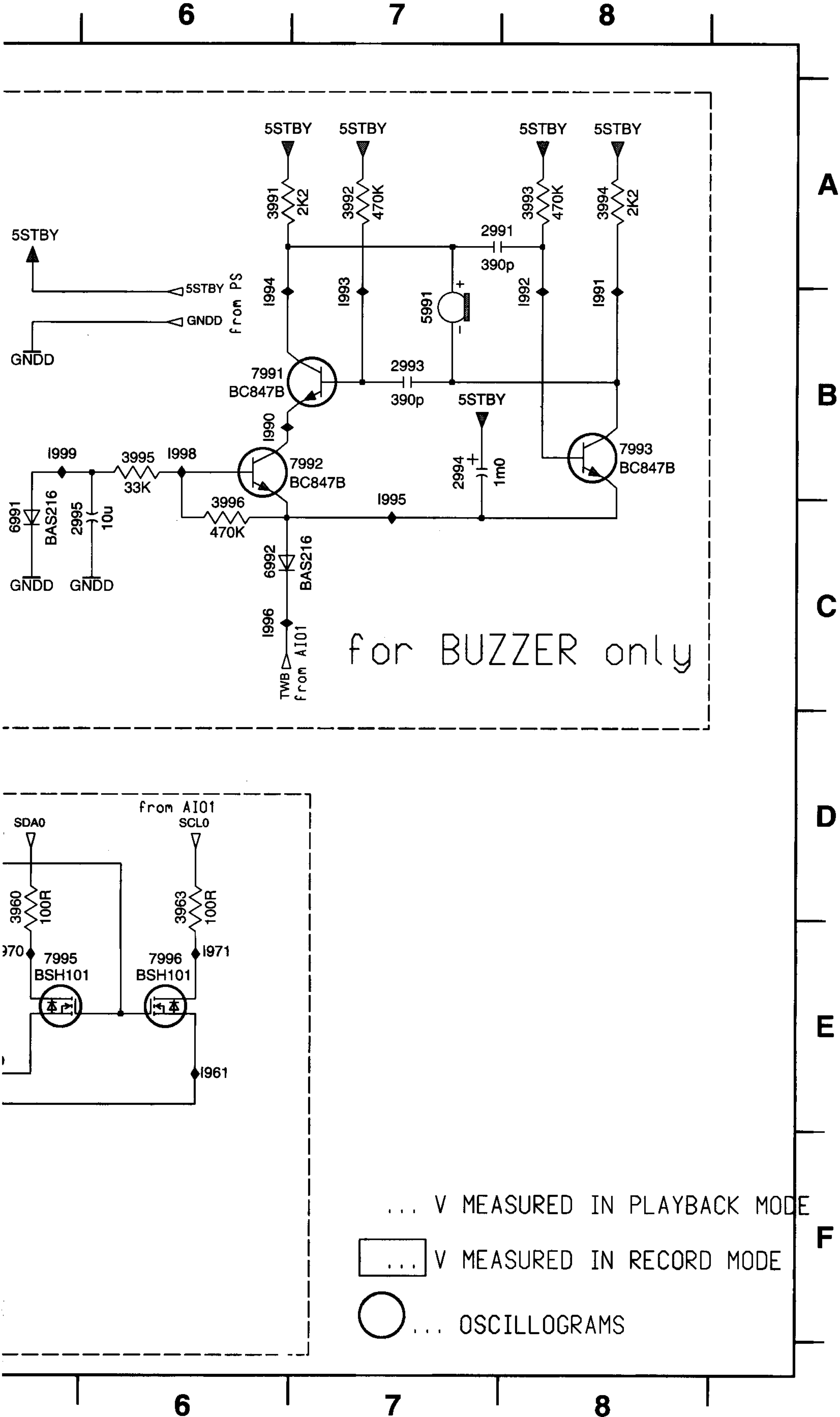

6
7
8
9
A
B
C
D
E
F
2471
47u
I439
470R
3453
220R
I440
3,1V
2,5V
54
1 CTL_FB
2 CTL_INIOUT
3 VREF
4 POIFC
5 COMP1_IN
6 COMP2_IN
7 COMP3_IN
8 COMP4_IN
9 VCC
- AMPLIFIER
- FILTER
- DETECTOR
WRITE AMPLIFIER
Vref
POWER-ON AND POWER-FAIL DETECTOR
CAP_REV 18
POIF_OUT 17
CTL_DATA 16
COMP1_OUT 15
COMP2_OUT 14
COMP3_OUT 13
GND 12
COMP4_OUT 11
WR 10
7443
SAA1310
0V
5,1V
I447
VISS from AI01
5DS
2,2V
3,2V
I448
SYNC to/from AI01
3458 4K7
3459 4K7
47K
2475
47u
2476
33n
I441
2,1V
GNDD
I449
2,4V
WTRD to AI01
I442
2,3V
I450
5,2V
WTLD to AI01
62
0,7V
I444
2,5V
I451
2,6V
FGD to AI01
5DS
5,2V
I452
5,1V
0V
3465 15K
I453
W_R from AI01
2480 100u
3467 2M2
3468 100K
for WTL only
3469 100K
2482 100n
63
64
2490 100n
I454
3470 4K7
1946
from/to Tape-Deck 0200
GNDM2
F4601 1
F4602 2
F4603 0,1V 3
F4604 4
F4605 2,6V 5
F4606 5,2V 6
F4607 2,6V 7
14,6V 8
5DSB
3475 27K
I445
2463 10n for WTL only
GNDDB
14M1
5DS
I419
4807
5807
BLM21 not used
I418
4804
5804
BLM21 not used
4499
9491
9492
9493
9494
9495
9496
9497
9498
2461 4n7
2462 470u 16V
CREV from AI01
CAP from AI01
9_14M2 from PS
PS
○... OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
[...] V MEASURED IN RECORD MODE

0007	E5
0008	B3
1946	D9
1947	A3
1948	D5
2461	F8
2462	F8
2463	E6
2471	A6
2472	A2
2473	A5
2474	B5
2475	B6
2476	B6
2477	B2
2478	C2
2479	B5
2480	C6
2482	C9
2483	D1
2484	E4
2485	E4
2486	E4
2487	E3
2489	E1
2490	D8
2491	E1
2492	E4
2493	E3
2494	F1
2495	F3
2496	F3
2497	F1
3450	A1
3451	A1
3452	A5
3453	A6
3454	A5
3455	A2
3456	B5
3457	B1
3458	B8
3459	B9
3460	B4
3461	B1
3462	B5
3463	B1
3464	B2
3465	C9
3466	C3
3467	C8
3468	C8
3469	C8
3470	D9
3471	D4
3472	D4
3473	D4
3474	E5
3475	E5
3476	E1
3477	E1
3952	B5
4499	F6
4804	F6
4807	E7
5471	D1
5804	F6
5807	E7
7440-A	A2
7440-B	B2
7442	A5
7443	C7
7446	F2
7464	B4
7465	E5
9491	D7
9492	E7
9493	E7
9494	E7
9495	E7
9496	E7
9497	E7
9498	E7
F4601	D9
F4602	E9
F4603	E9
F4604	E9
F4605	E9
F4606	E9
F4607	E9
F4701	A3
F4703	B3
F472	A2
F473	A2
F474	E1
F4801	D5
F4802	D5
F4803	D5
F4804	D5
F4805	D5
F4806	D5
I418	F6
I419	E6
I420	A1
I421	A1
I422	B2
I423	B1
I424	C1
I425	C2
I426	E1
I427	F1
I428	F1
I429	F3
I430	F3
I431	F3
I432	E3
I433	E3
I434	E3
I435	E4
I436	E4
I437	A4
I438	A5
I439	A6
I440	A6
I441	B6
I442	B6
I443	B4
I444	C6
I445	E6
I446	E5
I447	A9
I448	A9
I449	B8
I450	B9
I451	C9
I452	C8
I453	C9
I454	D8
I848	B5

Clock, VPS, Buzzer (CVB) - Recorder Unit Board (RUBAD)


1
2
3
4
5
A
B
C
D
E
F
5STBY
5STBY from PS
GNDD from PS
GNDD
5AS2
GNDFV2
5AS2
GNDFV2
5STBY
6970
BAT85
F972
3971 10K
3970 10K
2971 220m for 4DAYS only
2970 1m0 delete for 4DAYS
GNDD
GNDD
I972
2972 27p
2973 10n
GNDD
I973
1970 DT-38 32K768 32,768kHz
I974
F971
5,1V
8
7970
PCF8593P
VDD
1 OSCI
2 OSCO
7 INT_
3 RESET
6 SCL
5 SDA
2,5V
4,8V
0V
5,1V
5,1V
5,1V
OSCILLATOR
DIVIDER
CONTROL LOGIC
RESET
CLOCK / CALENDAR
I^2 C-BUS INTERFACE
ADDRESS REGISTER
VSS
4
GNDD
I976
SCL0 to AI01
3973 100R
I977
SDA0 to AI01
3974 100R
I978
5STBY
3976 10K
5,1V
ICLKRESET from AI02
I979
0,1V
7971 BC847B
2975 10n
GNDD
GNDD
5AS2
5960 6u8
GNDFV2
7960 SDA5650
8 TI
9 PD1
10
11 VCO1
12 IREF
13 CVBS
14 VDD
7 EHB
6 DAVN
5 VCS
4 CSO
3 SDA
2 SCL
1 VSS
I963
I968
I966
I964
I965
I967
GNDFV2
3999 10K
3998
77
VPDC from VS
4960
2960 470n
3962 100R
3961 100K
3964 470K
GNDFV2
3965 6K8
I969
3966 1M
2961 100n
3967 1M
3968 6K8
2962 100n
2963 33n
2964 2n2
GNDFV2
GNDFV2
GNDFV2
GNDFV2
GNDFV2
GNDFV2
for 2 TUNER SETS only

Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	


6
7
8
A
B
C
D
E
F
5STBY
5STBY
5STBY
5STBY
3991
2K2
3992
470K
3993
470K
3994
2K2
2991
390p
5STBY
5STBY
GNDD
from PS
GNDD
I994
I993
5991
I992
I991
7991
BC847B
2993
390p
5STBY
I990
7993
BC847B
I999
3995
33K
I998
7992
BC847B
2994
1m0
6991
BAS216
2995
10u
3996
470K
I995
GNDD
GNDD
6992
BAS216
I996
TWB
from AI01
for BUZZER only
from AI01
SDA0
SCL0
3960
100R
3963
100R
I970
7995
BSH101
7996
BSH101
I971
I961
6
7
8

... V MEASURED IN PLAYBACK MODE

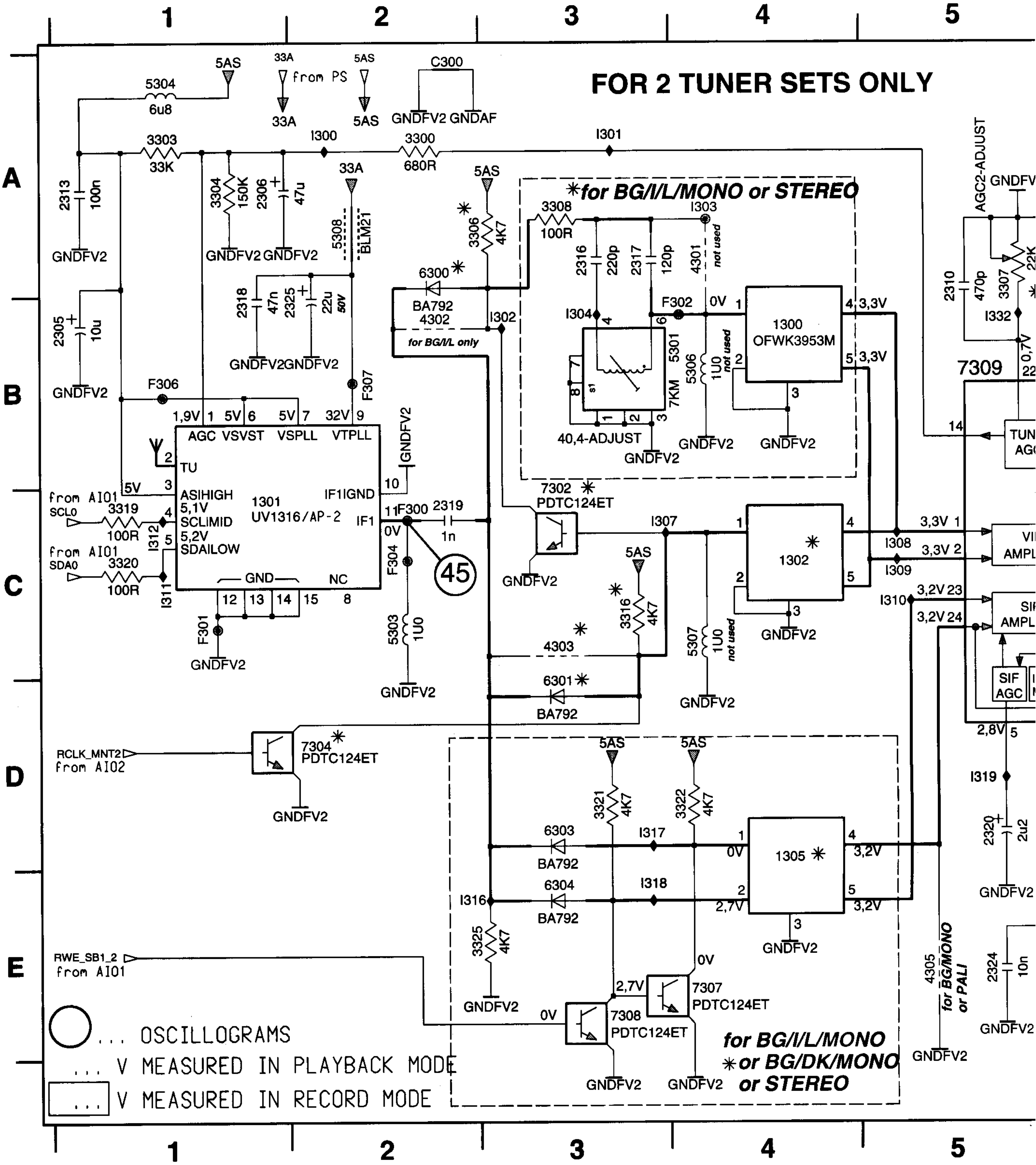
... V MEASURED IN RECORD MODE

... OSCILLOGRAMS

1970	B1
2960	E1
2961	F2
2962	F3
2963	F2
2964	F3
2970	A3
2971	A2
2972	B1
2973	B2
2975	D2
2991	A7
2993	B7
2994	B7
2995	C6
3960	D5
3961	E2
3962	E2
3963	D6
3964	F1
3965	F2
3966	F2
3967	F3
3968	F3
3970	A2
3971	A2
3973	C1
3974	C1
3976	D2
3991	A6
3992	A7
3993	A8
3994	A8
3995	B6
3996	C6
3998	E5
3999	E5
4960	E1
5960	D3
5991	B7
6970	A2
6991	C5
6992	C6
7960	D4
7970	B4
7971	D2
7991	B6
7992	B6
7993	B8
7995	E5
7996	E6
F971	C2
F972	A2
I960	E5
I961	E6
I963	E3
I964	E3
I965	E3
I966	E3
I967	E3
I968	E3
I969	F2
I970	E5
I971	E6
I972	B2
I973	B2
I974	C2
I976	C2
I977	C1
I978	C1
I979	D1
I990	B6
I991	B8
I992	B8
I993	B7
I994	B6
I995	B7
I996	C6
I998	B6
I999	B5

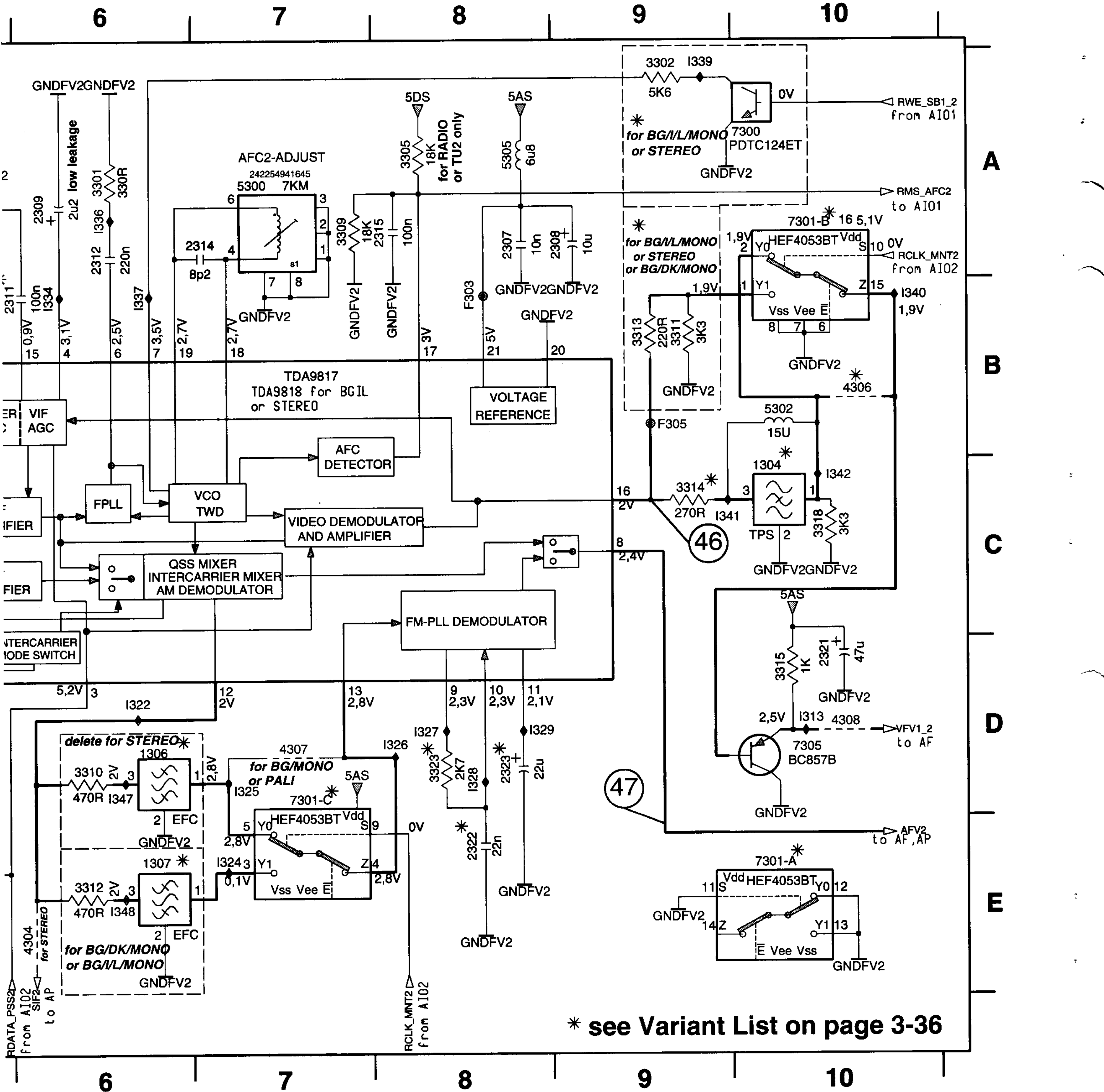
Tuner 2 (TU2) - Recorder Unit Board (RUBAD)

1300 B4	2305 B1	2312 A6	2319 C2	3300 A2	3307 B5	3314 C9	3322 D4	4305 E5	5303 C2
1301 C1	2306 A1	2313 A1	2320 D5	3301 A6	3308 A3	3315 D10	3323 D8	4306 B10	5304 A1
1302 C4	2307 A8	2314 A7	2321 D10	3302 A9	3309 A7	3316 C3	3325 E3	4307 D7	5305 A8
1304 C10	2308 A9	2315 A8	2322 E8	3303 A1	3310 D6	3318 C10	4301 A4	4308 D10	5306 B4
1305 D4	2309 A6	2316 A3	2323 D8	3304 A1	3311 B9	3319 C1	4302 B2	5300 A7	5307 C4
1306 D6	2310 A5	2317 A3	2324 E5	3305 A8	3312 E6	3320 C1	4303 C3	5301 B3	5308 A2
1307 E6	2311 B6	2318 B1	2325 B2	3306 A3	3313 B9	3321 D3	4304 E6	5302 B10	6300 A2


1
2
3
4
5
A
B
C
D
E
FOR 2 TUNER SETS ONLY
5304
6u8
5AS
33A
from PS
33A
5AS
C300
GNDFV2
GNDAF
3303
33K
I300
3300
680R
I301
2313
100n
3304
150K
2306
47u
5308
BLM21
6300
BA792
4302
for BG/I/L only
3306
4K7
*for BG/I/L/MONO or STEREO
3308
100R
2316
220p
2317
120p
4301
not used
I303
I304
F302
0V
1300
OFWK3953M
3,3V
5301
7KM
5306
1U0
40,4-ADJUST
2318
47n
2325
22u
50V
2305
10u
F306
F307
1,9V
AGC
VSVST
5V
VSPLL
32V
VTPLL
TU
ASIHIGH
5,1V
SCLIMID
5,2V
SDAILOW
1301
UV1316/AP-2
IF1IGND
IF1
GND
NC
0V
F300
2319
1n
45
F304
5303
1U0
F301
from AI01
SCL0
3319
100R
I312
from AI01
SDA0
3320
100R
I311
7302
PDTC124ET
I307
I302
1302
3,3V 1
3,3V 2
I308
I309
5AS
3316
4K7
4303
6301
BA792
5307
1U0
not used
7304
PDTC124ET
RCLK_MNT2
from AI02
3321
4K7
3322
4K7
6303
BA792
I317
1305
3,2V
6304
I318
2,7V
I316
3325
4K7
0V
7307
PDTC124ET
7308
PDTC124ET
RWE_SB1_2
from AI01
for BG/I/L/MONO
*or BG/DK/MONO
or STEREO
AGC2-ADJUST
2310
470p
3307
22K
I332
0,7V
7309
14
TUN
AGC
VI
AMPL
3,2V 23
3,2V 24
I310
SI
AMPL
SIF
AGC
2,8V
I319
2320
2u2
4305
for BG/MONO
or PAL/I
2324
10n
... OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE

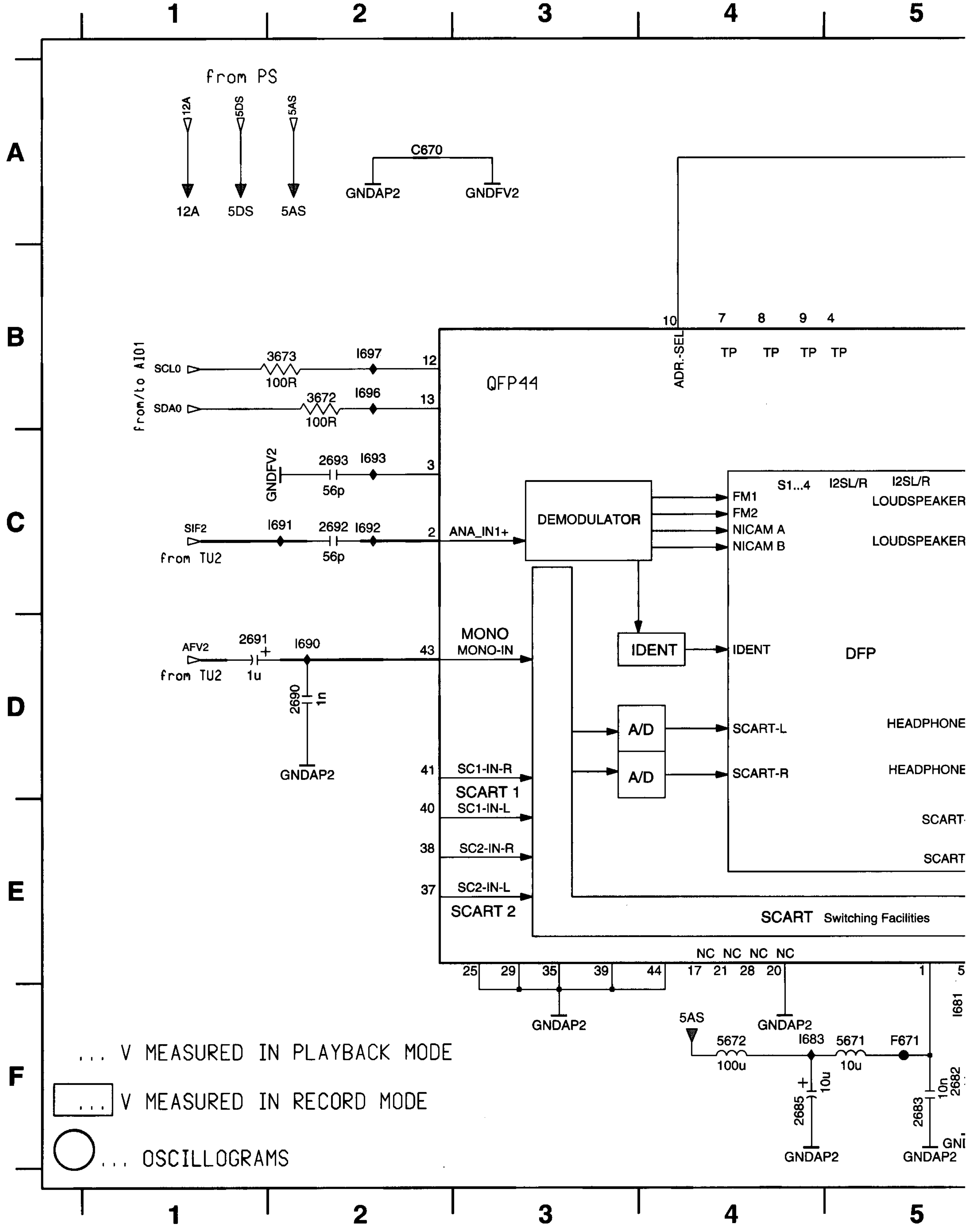
Interconnections															
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

6301 D3	7302 C3	F300 C2	F307 B2	I308 C5	I317 D3	I327 D8	I339 A9
6303 D3	7304 D2	F301 C1	I300 A2	I309 C5	I318 E3	I328 D8	I340 B10
6304 E3	7305 D10	F302 B4	I301 A3	I310 C5	I319 D5	I329 D8	I341 C9
7300 A10	7307 E4	F303 B8	I302 B3	I311 C1	I322 D6	I332 B5	I342 C10
7301-A E10	7308 E3	F304 C2	I303 A4	I312 C1	I324 E7	I334 B6	I347 D6
7301-B A10	7309 B5	F305 B9	I304 B3	I313 D10	I325 D7	I336 A6	I348 E6
7301-C D7	C300 A2	F306 B1	I307 C3	I316 E2	I326 D8	I337 B6	

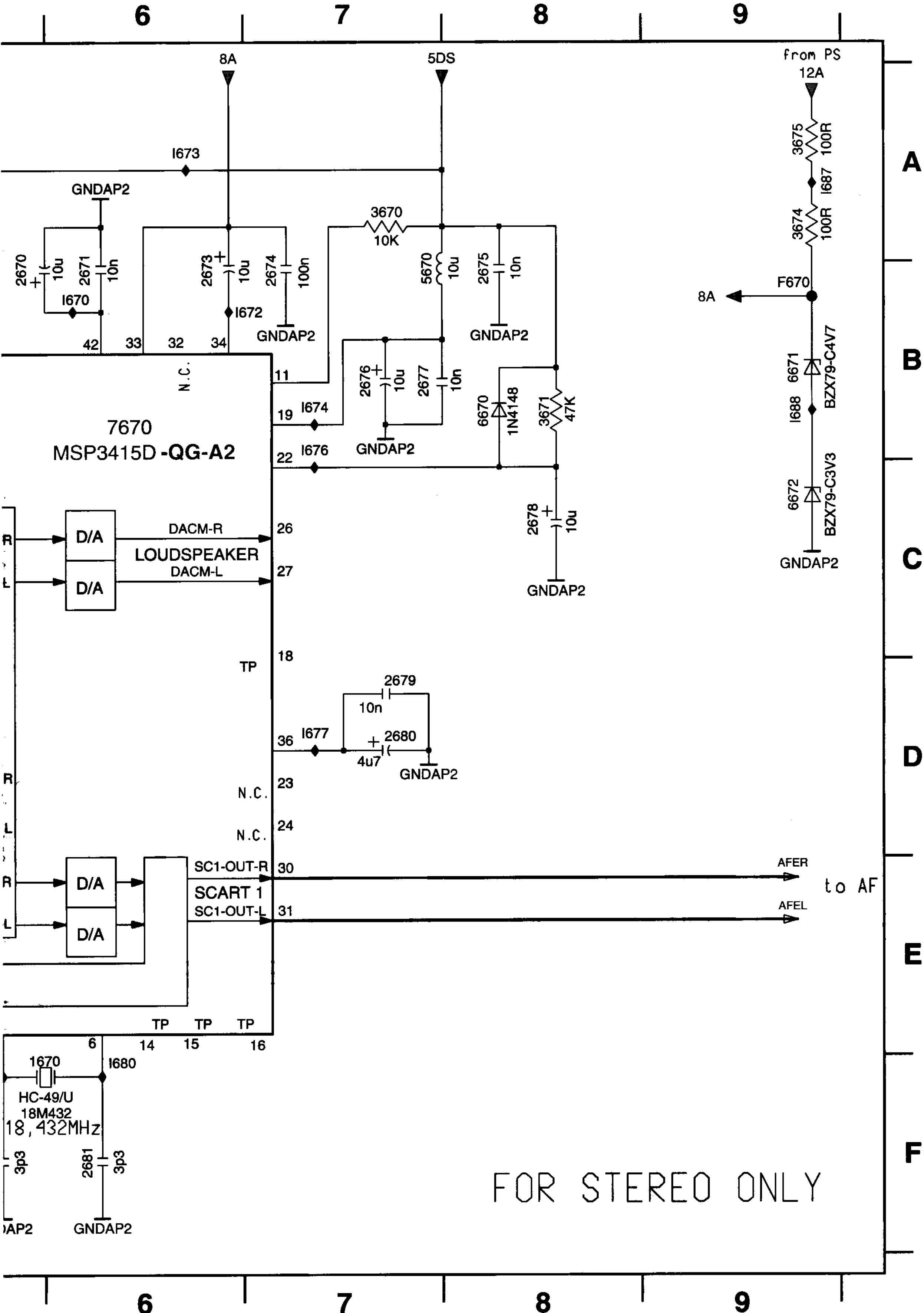

6
7
8
9
10
A
B
C
D
E
GNDFV2
3302
5K6
I339
0V
RWE_SB1_2
from AI01
for BG/I/L/MONO
or STEREO
7300
PDTC124ET
5DS
5AS
3305
18K
for RADIO
or TU2 only
5305
6u8
AFC2-ADJUST
242254941645
5300
7KM
RMS_AFC2
to AI01
2309
2u2
low leakage
3301
330R
I336
2312
220n
2314
8p2
3309
18K
2315
100n
2307
10n
2308
10u
7301-B
16 5,1V
HEF4053BT
Vdd
for BG/I/L/MONO
or STEREO
or BG/DK/MONO
1,9V
Y0
S
10 0V
RCLK_MNT2
from AI02
Y1
Z 15
I340
1,9V
Vss Vee E
2311
100n
I334
I337
F303
3313
220R
3311
3K3
0,9V
3,1V
2,5V
3,5V
2,7V
2,7V
3V
5V
TDA9817
TDA9818 for BGIL
or STEREO
VOLTAGE
REFERENCE
4306
VIF
AGC
AFC
DETECTOR
F305
5302
15U
1304
I342
FPLL
VCO
TWD
VIDEO DEMODULATOR
AND AMPLIFIER
3314
270R
I341
TPS
3318
3K3
46
QSS MIXER
INTERCARRIER MIXER
AM DEMODULATOR
2,4V
FM-PLL DEMODULATOR
TERCARRIER
ODE SWITCH
3315
1K
2321
47u
5,2V
I322
2V
2,8V
2,3V
2,3V
2,1V
2,5V
I313
4308
VFV1_2
to AF
7305
BC857B
delete for STEREO
1306
3310
470R
I347
EFC
4307
for BG/MONO
or PALI
I325
7301-C
HEF4053BT
I326
I327
3323
2K7
I328
2323
22u
I329
47
AFV2
to AF,AP
2322
22n
1307
3312
470R
I348
I324
0,1V
2,8V
7301-A
HEF4053BT
for BG/DK/MONO
or BG/I/L/MONO
4304
for STEREO
RDATA_PSS2
from AI02
SIF2
to AP
RCLK_MNT2
from AI02

* see Variant List on page 3-36

Sound Processing (AP) - Recorder Unit Board (RUBAD)

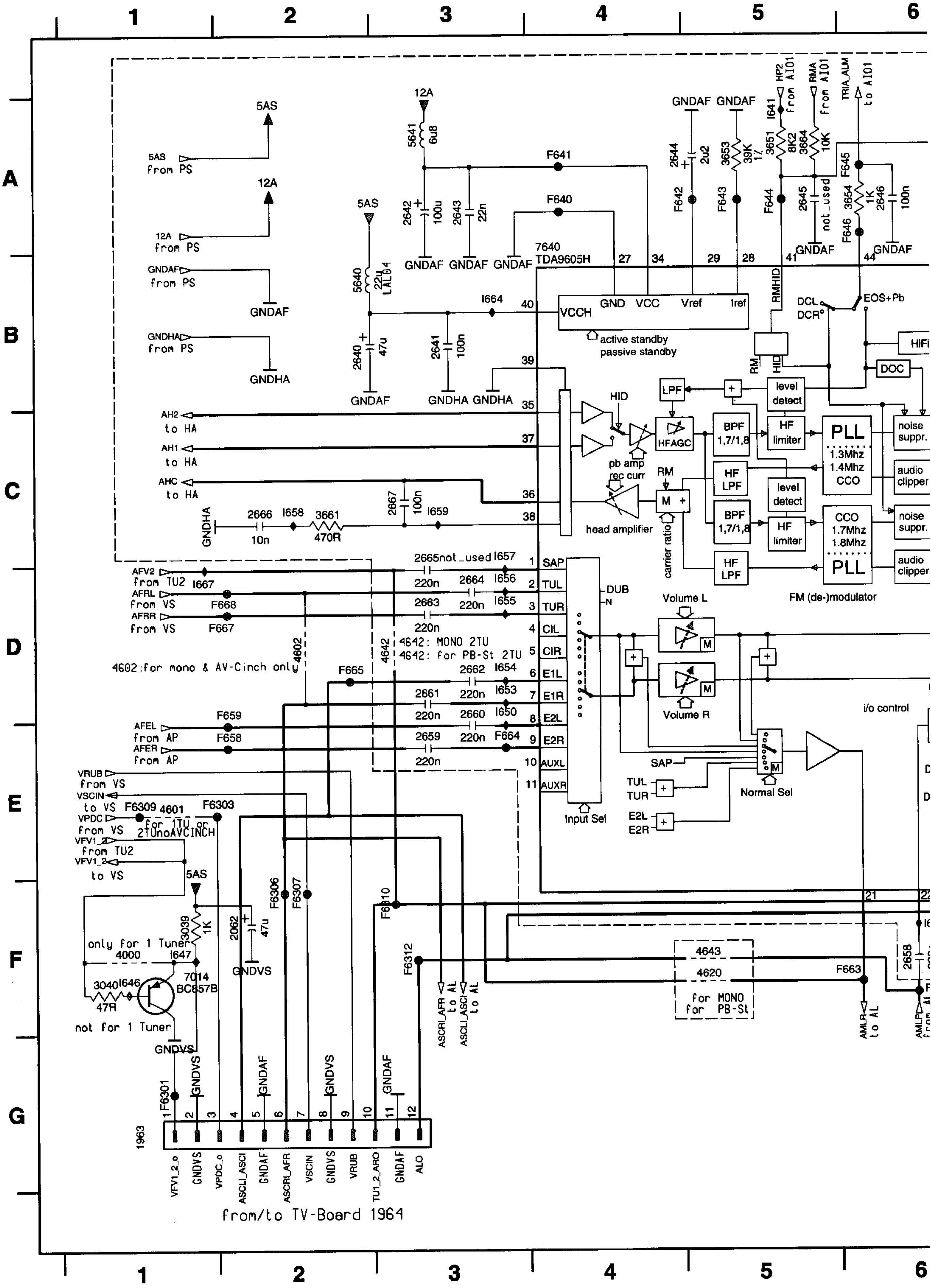

1
2
3
4
5
A
B
C
D
E
F
from PS
12A
5DS
5AS
12A
5DS
5AS
C670
GNDAP2
GNDFV2
10
7
8
9
4
ADR.-SEL
TP
TP
TP
TP
from/to AI01
SCL0
3673
100R
I697
12
SDA0
3672
100R
I696
13
QFP44
GNDFV2
2693
56p
I693
3
SIF2
from TU2
I691
2692
56p
I692
2
ANA_IN1+
DEMODULATOR
FM1
FM2
NICAM A
NICAM B
S1...4
I2SL/R
I2SL/R
LOUDSPEAKER
LOUDSPEAKER
AFV2
from TU2
2691
1u
I690
43
MONO
MONO-IN
IDENT
IDENT
DFP
2690
1n
GNDAP2
A/D
A/D
SCART-L
SCART-R
HEADPHONE
HEADPHONE
41
SC1-IN-R
SCART 1
40
SC1-IN-L
SCART
SCART
38
SC2-IN-R
37
SC2-IN-L
SCART 2
SCART Switching Facilities
NC NC NC NC
25
29
35
39
44
17
21
28
20
1
5
GNDAP2
GNDAP2
5AS
5672
100u
I683
5671
10u
F671
I681
2685
10u
2683
10n
2682
GNDAP2
GNDAP2
GNI
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
... OSCILLOGRAMS

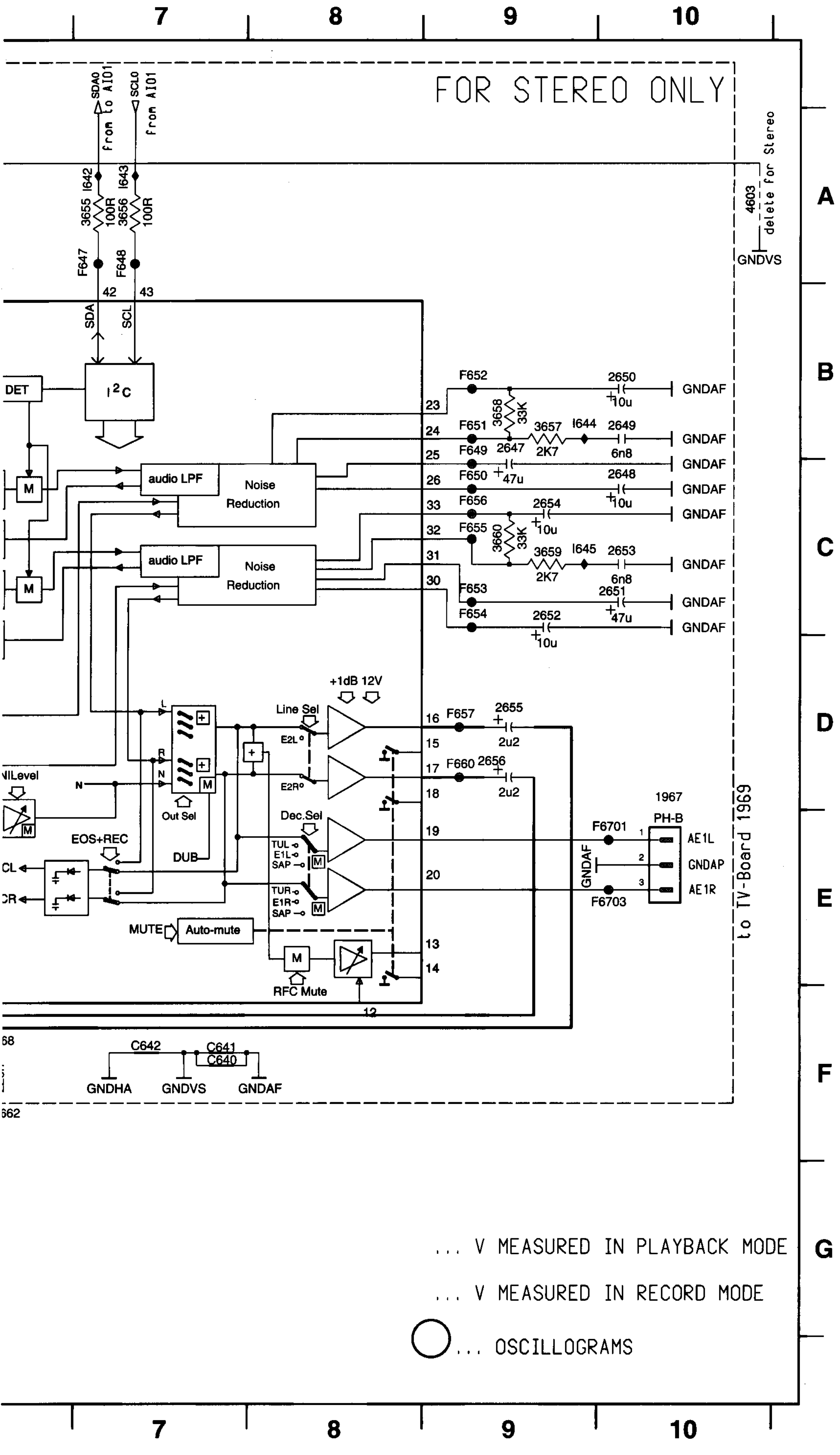
	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	


6
7
8
9
A
B
C
D
E
F
8A
5DS
from PS
12A
I673
GNDAP2
3670
10K
3675
100R
I687
3674
100R
2670
10u
2671
10n
I670
2673
10u
2674
100n
I672
GNDAP2
5670
10u
2675
10n
GNDAP2
F670
8A
42
33
32
34
N.C.
11
19
I674
22
I676
2676
10u
2677
10n
GNDAP2
6670
1N4148
3671
47K
6671
BZX79-C4V7
I688
6672
BZX79-C3V3
GNDAP2
2678
10u
GNDAP2
7670
MSP3415D -QG-A2
R
L
D/A
D/A
DACM-R
LOUDSPEAKER
DACM-L
26
27
TP
18
2679
10n
36
I677
2680
4u7
GNDAP2
R
L
N.C.
23
N.C.
24
R
L
D/A
D/A
SC1-OUT-R
30
SCART 1
SC1-OUT-L
31
AFER
AFEL
to AF
TP
TP
TP
6
14
15
16
1670
I680
HC-49/U
18M432
18,432MHz
3p3
2681
3p3
AP2
GNDAP2
FOR STEREO ONLY

1670	F5
2670	B5
2671	B6
2673	B6
2674	B7
2675	B8
2676	B7
2677	B7
2678	C8
2679	D7
2680	D7
2681	F6
2682	F5
2683	F5
2685	F4
2690	D2
2691	D1
2692	C2
2693	C2
3670	A7
3671	B8
3672	B2
3673	B2
3674	A9
3675	A9
5670	B7
5671	F5
5672	F4
6670	B8
6671	B9
6672	C9
7670	B6
C670	A2
F670	B9
F671	F5
I670	B6
I672	B7
I673	A6
I674	B7
I676	B7
I677	D7
I680	F6
I681	F5
I683	F4
I687	A9
I688	B9
I690	D2
I691	C2
I692	C2
I693	C2
I696	B2
I697	B2

FM-Audio Processing (AF) - Recorder Unit Board (RUBAD)

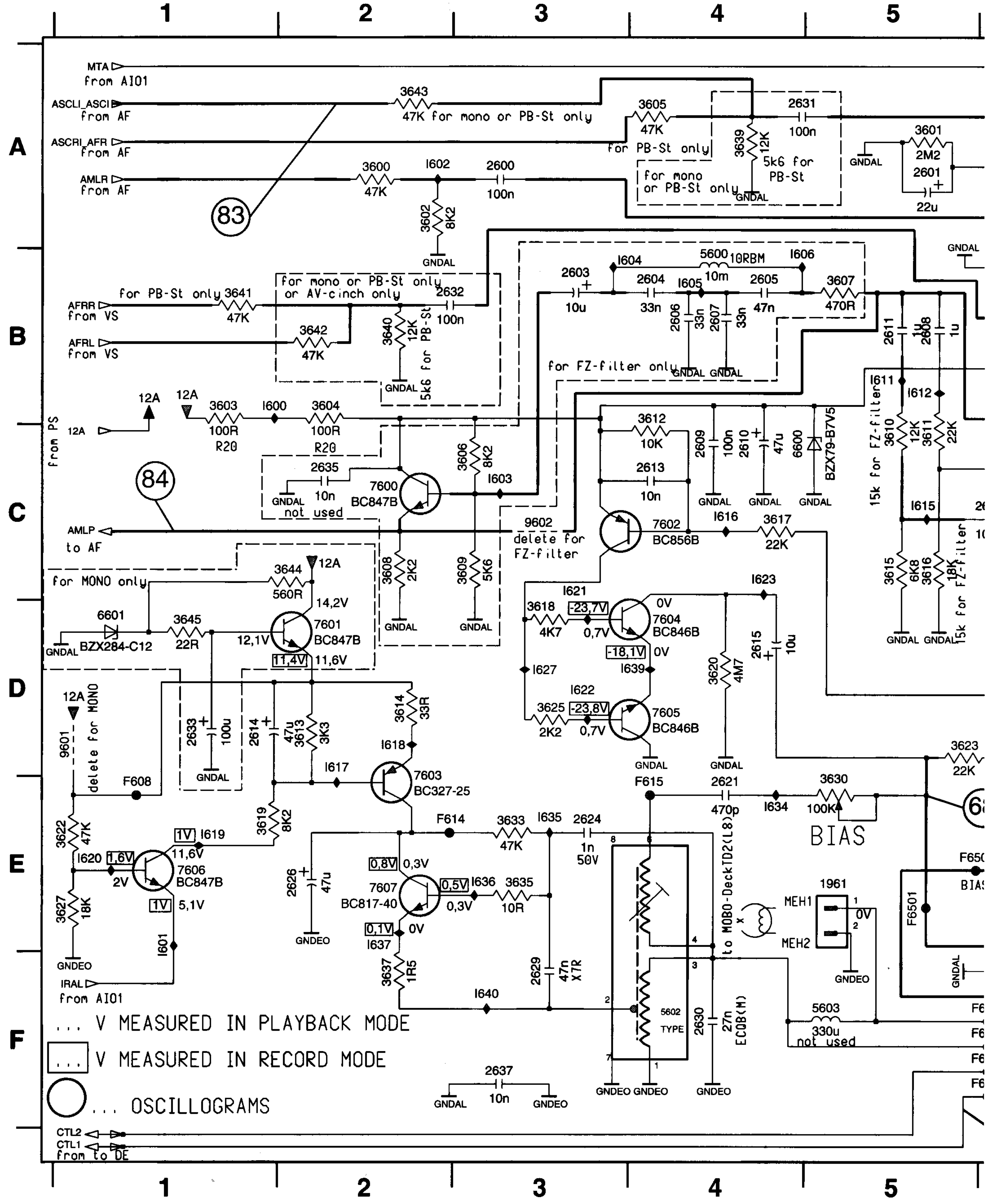

1
2
3
4
5
6
A
B
C
D
E
F
G
5AS
5AS from PS
12A
12A from PS
GNDAF from PS
GNDAF
GNDHA from PS
GNDHA
12A
5641 6u8
F641
2642 100u
2643 22n
GNDAF GNDAF GNDAF
F640
5AS
5640 22u LAL04
7640 TDA9605H
I664
2640 47u
2641 100n
GNDHA GNDHA
GNDAF
2644 2u2
3653 39K 1%
F642
F643
HP2 from AI01
RMA from AI01
TRIA_ALM to AI01
I641
3651 8K2
3664 10K
F644
2645 not_used
F645
3654 1K
2646 100n
F646
GNDAF
27 34 29 28 41 44
GND VCC Vref Iref
VCCH
40
active standby
passive standby
RMHID
DCL
DCR°
EOS+Pb
HiFi
DOC
RM
HID
39
35
37
36
38
AH2 to HA
AH1 to HA
AHC to HA
HID
pb amp
rec curr
LPF
+
level detect
HFAGC
BPF 1,7/1,8
HF limiter
PLL
1.3Mhz
1.4Mhz
CCO
noise suppr.
audio clipper
RM
M +
head amplifier
carrier ratio
HF LPF
level detect
BPF 1,7/1,8
HF limiter
CCO
1.7Mhz
1.8Mhz
noise suppr.
HF LPF
PLL
audio clipper
FM (de-)modulator
GNDHA
2666 10n
I658
3661 470R
2667 100n
I659
AFV2 from TU2
AFRL from VS
AFRR from VS
I667
F668
F667
2665not_used
I657
220n
2664
I656
2663
220n
I655
1 SAP
2 TUL
3 TUR
4 CIL
5 CIR
6 E1L
7 E1R
8 E2L
9 E2R
10 AUXL
11 AUXR
DUB
N
4642: MONO 2TU
4642: for PB-St 2TU
4602
4642
4602:for mono & AV-Cinch only
F665
2662
I654
2661
220n
I653
2660
I650
2659
F664
AFEL from AP
AFER from AP
F659
F658
Volume L
Volume R
M
+
Input Sel
SAP
TUL
TUR
E2L
E2R
Normal Sel
i/o control
VRUB from VS
VSCIN to VS
VPDC from VS
F6309
4601 for 1TU or 2TUnoAVCINCH
F6303
VFV1_2 from TU2
VFV1_2 to VS
5AS
3039 1K
2062 47u
GNDVS
only for 1 Tuner
4000
I647
7014 BC857B
3040 I646 47R
not for 1 Tuner
GNDVS
F6306
F6307
F6310
F6312
ASCRI_AFR to AL
ASCLI_ASCI to AL
4643
4620
for MONO
for PB-St
F663
AMLR to AL
AMLP
21
2658
F6301
GNDVS
GNDAF
GNDVS
GNDAF
1 2 3 4 5 6 7 8 9 10 11 12
1963
VFV1_2_o
GNDVS
VPDC_o
ASCLI_ASCI
GNDAF
ASCRI_AFR
VSCIN
GNDVS
VRUB
TU1_2_ARO
GNDAF
ALO
from/to TV-Board 1964


7
8
9
10
A
B
C
D
E
F
G
FOR STEREO ONLY
SDA0 to AI01
SCL0 from AI01
I642
I643
3655 100R
3656 100R
F647
F648
42
43
SDA
SCL
4603 delete for Stereo
GNDVS
DET
I²C
audio LPF
Noise Reduction
audio LPF
Noise Reduction
M
M
F652
2650
10u
GNDAF
23
24
25
26
33
32
31
30
F651
3658 33K
3657 2K7
I644
2649 6n8
F649
2647
F650
47u
2648
10u
F656
2654
10u
F655
3660 33K
3659 2K7
I645
2653 6n8
F653
2651 47u
F654
2652 10u
+1dB 12V
Line Sel
E2L
E2R
L
R
N
N
NILevel
Out Sel
DUB
EOS+REC
CL
CR
Dec.Sel
TUL
E1L
SAP
TUR
E1R
SAP
MUTE
Auto-mute
RFC Mute
16
15
17
18
19
20
13
14
12
F657
2655 2u2
F660
2656 2u2
1967
PH-B
F6701
F6703
GNDAF
AE1L
GNDAP
AE1R
1
2
3
to TV-Board 1969
68
C642
C641
C640
GNDHA
GNDVS
GNDAF
662
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
... OSCILLOGRAMS

1963	G1
1967	D10
2062	F2
2640	B2
2641	B3
2642	A3
2643	A3
2644	A4
2645	A5
2646	A6
2647	B9
2648	C10
2649	B10
2650	B10
2651	C10
2652	C9
2653	C10
2654	C9
2655	D9
2656	D9
2658	F6
2659	E3
2660	D3
2661	D3
2662	D3
2663	D3
2664	D3
2665	C3
2666	C2
2667	C3
3039	F1
3040	F1
3651	A5
3653	A5
3654	A6
3655	A7
3656	A7
3657	B9
3658	B9
3659	C9
3660	C9
3661	C2
3664	A5
4000	F1
4601	E1
4602	D2
4603	A10
4620	F5
4642	D3
4643	F5
5640	B2
5641	A3
7014	F1
7640	A4
C640	F7
C641	F7
C642	F7
F6301	G1
F6303	E2
F6306	F2
F6307	F2
F6309	E1
F6310	F3
F6312	F3
F640	A4
F641	A4
F642	A4
F643	A5
F644	A5
F645	A6
F646	A6
F647	A7
F648	A7
F649	B9
F650	C9
F651	B9
F652	B9
F653	C9
F654	C9
F655	C9
F656	C9
F657	D9
F658	E2
F659	D2
F660	D9
F662	F6
F663	F6
F664	E3
F665	D2
F667	D2
F668	D2
F6701	E10
F6703	E10
I641	A5
I642	A7
I643	A7
I644	B9
I645	C9
I646	F1
I647	F1
I650	D3
I653	D3
I654	D3
I655	D3
I656	D3
I657	C3
I658	C2
I659	C3
I664	B3
I667	D1
I668	F6

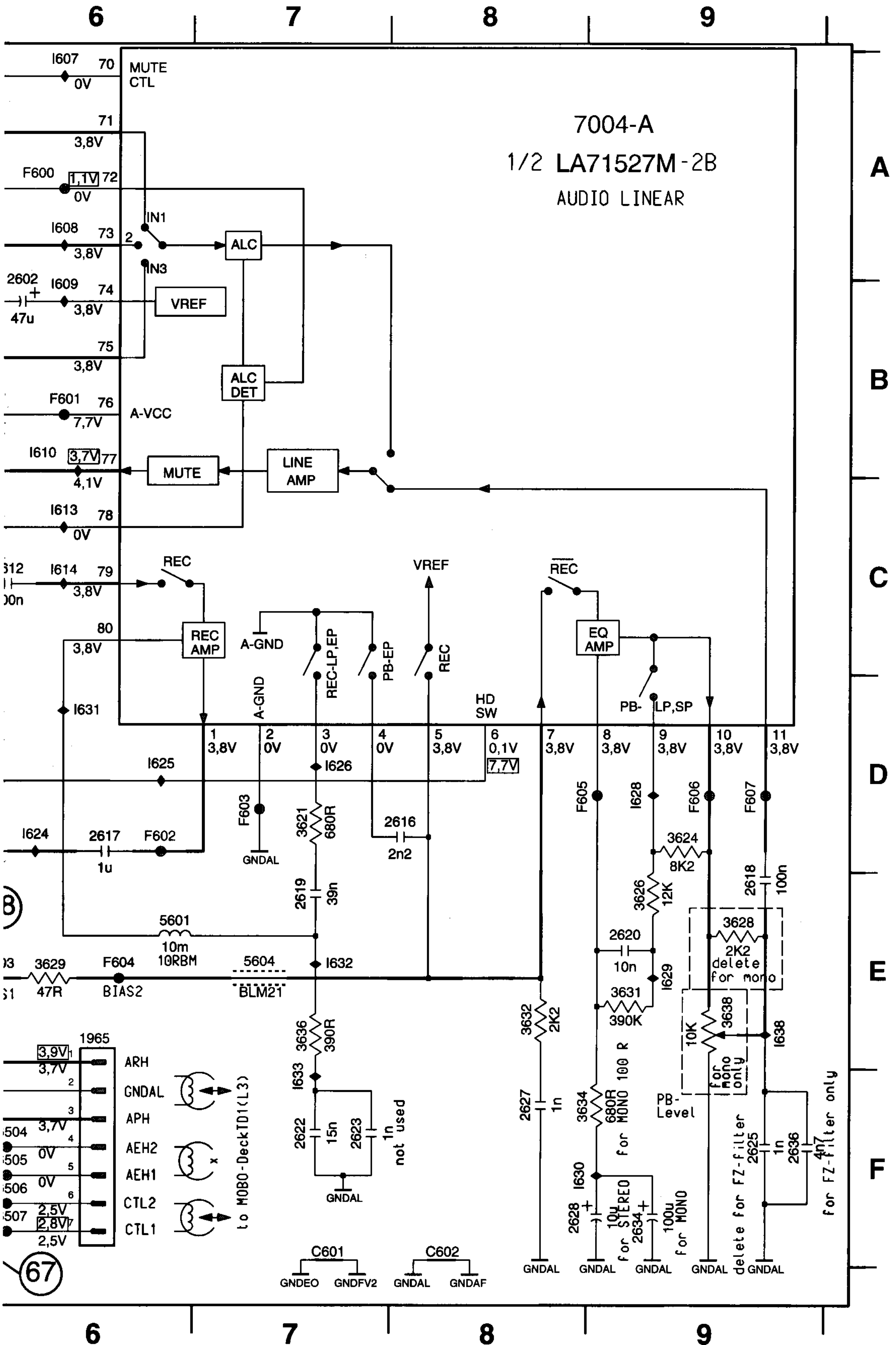
Interconnections	
Circuit	page
ACO	3-29
AF	3-22
AF2	3-30
AIO1	3-16
AIO2	3-17
AL	3-23
AMP	3-13
AP	3-21
COTV	3-14
CVB	3-19
DE	3-18
DOSCD	3-32
HA	3-26
HPAV	3-27
IO_1	3-11
KB1D	3-33
KB2D	3-34
LS	3-8
MFSWD	3-34
PS (RUB)	3-15
PS (TVB)	3-7
PT	3-28
SF	3-12
SFD	3-31
TU1	3-9
TU2	3-20
TV	3-10
VS	3-24
VSEC	3-25

Linear Audio Processing (AL) - Recorder Unit Board (RUBAD


1
2
3
4
5
A
B
C
D
E
F
MTA
from AI01
ASCLI_ASCI
from AF
ASCRI_AFR
from AF
AMLR
from AF
3643
47K for mono or PB-St only
3605
47K
for PB-St only
2631
100n
3639
12K
5k6 for PB-St
for mono or PB-St only
GNDAL
3601
2M2
2601
22u
3600
47K
I602
2600
100n
3602
8K2
83
AFRR
from VS
AFRL
from VS
for PB-St only
3641
47K
3642
47K
for mono or PB-St only or AV-cinch only
2632
100n
3640
12K
5k6 for PB-St
2603
10u
I604
2604
33n
I605
5600
10m
10RBM
I606
2605
47n
3607
470R
2606
33n
2607
33n
for FZ-filter only
2611
1u
2608
1u
I611
I612
3610
12K
3611
22K
15k for FZ-filter
I615
3615
6K8
3616
18K
from PS
12A
12A
3603
100R
R20
I600
3604
100R
R20
2635
10n
not used
7600
BC847B
3606
8K2
I603
3612
10K
2613
10n
2609
100n
2610
47u
6600
BZX79-B7V5
84
AMLP
to AF
9602
delete for FZ-filter
7602
BC856B
I616
3617
22K
3608
2K2
3609
5K6
for MONO only
3644
560R
6601
BZX284-C12
3645
22R
12,1V
7601
BC847B
14,2V
11,4V
11,6V
I621
3618
4K7
-23,7V
0,7V
7604
BC846B
0V
-18,1V
0V
I623
3620
4M7
2615
10u
I627
I639
I622
3625
2K2
-23,8V
0,7V
7605
BC846B
12A
9601
delete for MONO
F608
2633
100u
2614
47u
3613
3K3
3614
33R
I618
I617
7603
BC327-25
3619
8K2
3622
47K
I620
1,6V
2V
7606
BC847B
1V
I619
11,6V
1V
5,1V
3627
18K
I601
GNDEO
IRAL
from AI01
F614
3633
47K
I635
2624
1n
50V
2626
47u
0,8V
0,3V
7607
BC817-40
0,5V
0,3V
I636
3635
10R
0,1V
0V
I637
3637
1R5
I640
2629
47n
X7R
F615
2621
470p
I634
3630
100K
BIAS
3623
22K
F650
BIAS
1961
MEH1
MEH2
0V
F6501
to MOBO-DeckTD2(L8)
5602
TYPE
2630
27n
ECOB(M)
5603
330u
not used
2637
10n
GNDAL
GNDEO
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
... OSCILLOGRAMS
CTL2
CTL1
from to DE

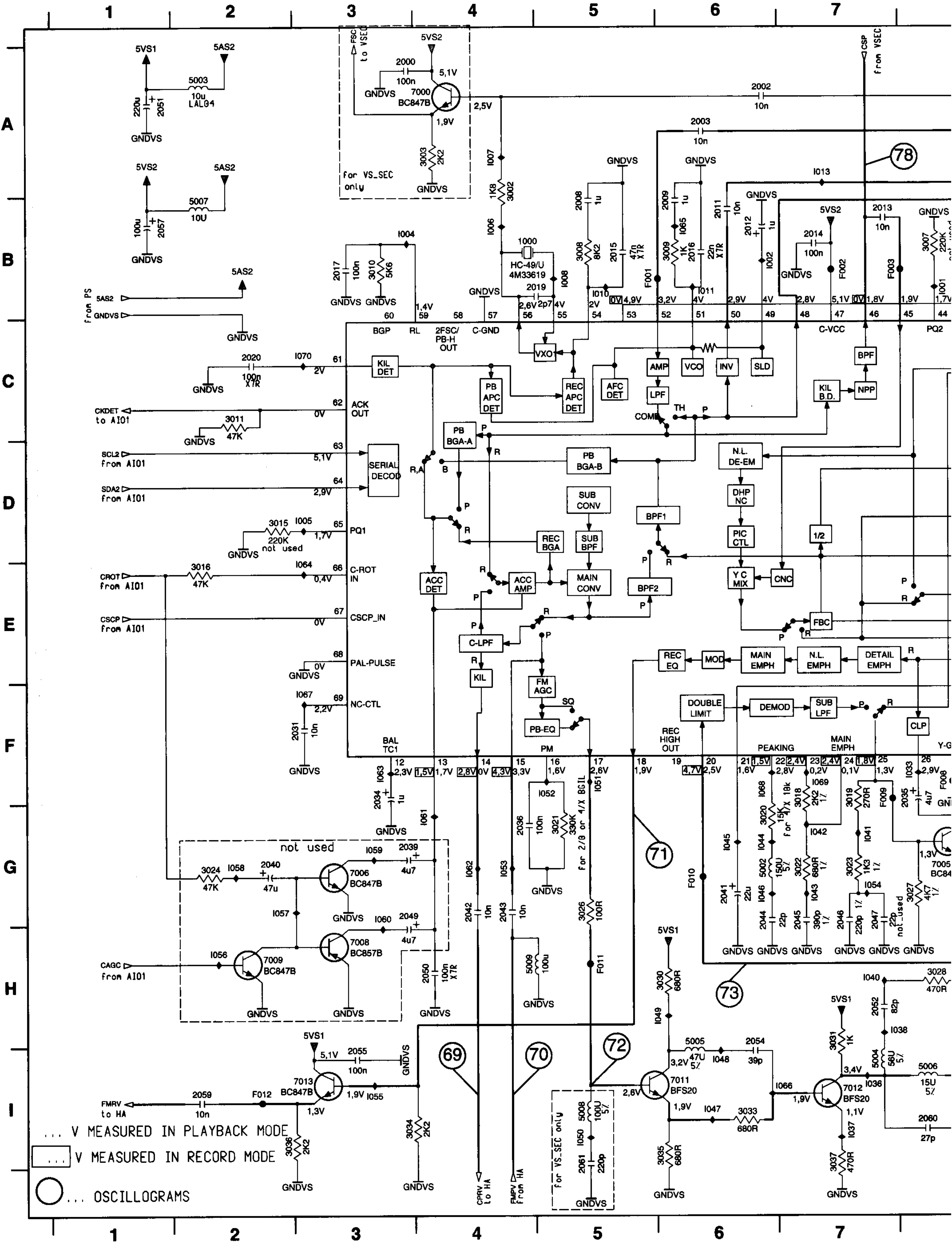
Interconnections

Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

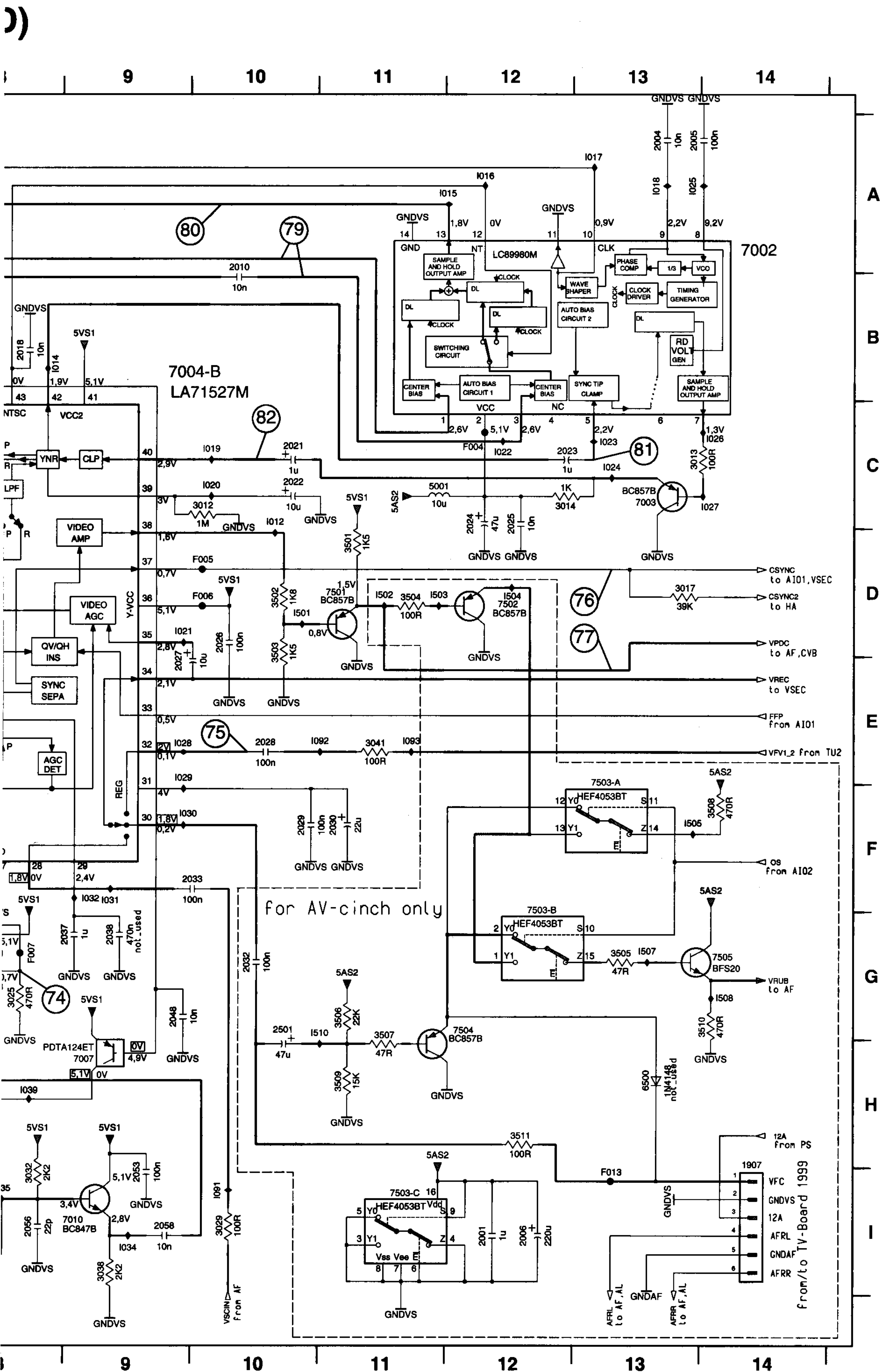

6
7
8
9
A
B
C
D
E
F
7004-A
1/2 LA71527M-2B
AUDIO LINEAR
I607
70
0V
MUTE
CTL
71
3,8V
F600
1,1V
72
0V
IN1
I608
73
2
3,8V
ALC
IN3
2602
47u
I609
74
3,8V
VREF
75
3,8V
ALC
DET
F601
76
7,7V
A-VCC
I610
3,7V
77
4,1V
MUTE
LINE
AMP
I613
78
0V
I614
79
3,8V
REC
80
3,8V
REC
AMP
A-GND
REC-LP,EP
PB-EP
VREF
REC
REC
EQ
AMP
HD
SW
PB-
LP,SP
I631
1
3,8V
2
0V
3
0V
4
0V
5
3,8V
6
0,1V
7,7V
7
3,8V
8
3,8V
9
3,8V
10
3,8V
11
3,8V
I625
I626
F603
GNDAL
3621
680R
2616
2n2
F605
I628
F606
F607
3624
8K2
I624
2617
1u
F602
2619
39n
3626
12K
2618
100n
5601
10m
10RBM
2620
10n
3628
2K2
delete
for mono
3629
47R
F604
BIAS2
5604
BLM21
I632
I629
3631
390K
3638
10K
for
mono
only
I638
1965
3,9V
3,7V
ARH
GNDAL
APH
3,7V
AEH2
0V
AEH1
0V
CTL2
2,5V
2,8V
CTL1
2,5V
to MOBO-DeckTD1(L3)
3636
390R
I633
2622
15n
2623
1n
not used
GNDAL
3632
2K2
2627
1n
3634
680R
100 R
for MONO
PB-
Level
2625
1n
2636
4n7
delete for FZ-filter
for FZ-filter only
I630
2628
10u
for STEREO
2634
100u
for MONO
C601
GNDEO
GNDFV2
C602
GNDAL
GNDAF
GNDAL
GNDAL
GNDAL
GNDAL
GNDAL
67

1961	E5
1965	E6
2600	A3
2601	A5
2602	B6
2603	B3
2604	B4
2605	B4
2606	B4
2607	B4
2608	B5
2609	C4
2610	C4
2611	B5
2612	C6
2613	C4
2614	D1
2615	D4
2616	D8
2617	D6
2618	E9
2619	E7
2620	E9
2621	E4
2622	F7
2623	F7
2624	E3
2625	F9
2626	E2
2627	F8
2628	F8
2629	F3
2630	F4
2631	A4
2632	B2
2633	D1
2634	F9
2635	C2
2636	F9
2637	F3
3600	A2
3601	A5
3602	A2
3603	B1
3604	B2
3605	A4
3606	C3
3607	B5
3608	C2
3609	C3
3610	C5
3611	C5
3612	B4
3613	D2
3614	D2
3615	C5
3616	C5
3617	C4
3618	D3
3619	E1
3620	D4
3621	D7
3622	E1
3623	D5
3624	D9
3625	D3
3626	E9
3627	E1
3628	E9
3629	E6
3630	D5
3631	E9
3632	E8
3633	E3
3634	F9
3635	E3
3636	E7
3637	F2
3638	E9
3639	A4
3640	B2
3641	B1
3642	B2
3643	A2
3644	C2
3645	D1
5600	B4
5601	E6
5602	F4
5603	F5
5604	E7
6600	C4
6601	D1
7004-A	A8
7600	C2
7601	D2
7602	C4
7603	E2
7604	D4
7605	D4
7606	E1
7607	E2
9601	D1
9602	C3
C601	F7
C602	F8
F600	A6
F601	B6
F602	D6
F603	D7
F604	E6
F605	D8
F606	D9
F607	D9
F608	E1
F614	E2
F615	E4
F6501	E5
F6503	E5
F6504	F6
F6505	F6
F6506	F6
F6507	F6
I600	B1
I601	E1
I602	A2
I603	C3
I604	B4
I605	B4
I606	B4
I607	A6
I608	A6
I609	B6
I610	B6
I611	B5
I612	B5
I613	C6
I614	C6
I615	C5
I616	C4
I617	D2
I618	D2
I619	E1
I620	E1
I621	C3
I622	D3
I623	C4
I624	D6
I625	D6
I626	D7
I627	D3
I628	D9
I629	E9
I630	F8
I631	D6
I632	E7
I633	F7
I634	E4
I635	E3
I636	E3
I637	E2
I638	E9
I639	D4
I640	F3

Video Signal Processing (VS) - Recorder Unit Board (RUBA

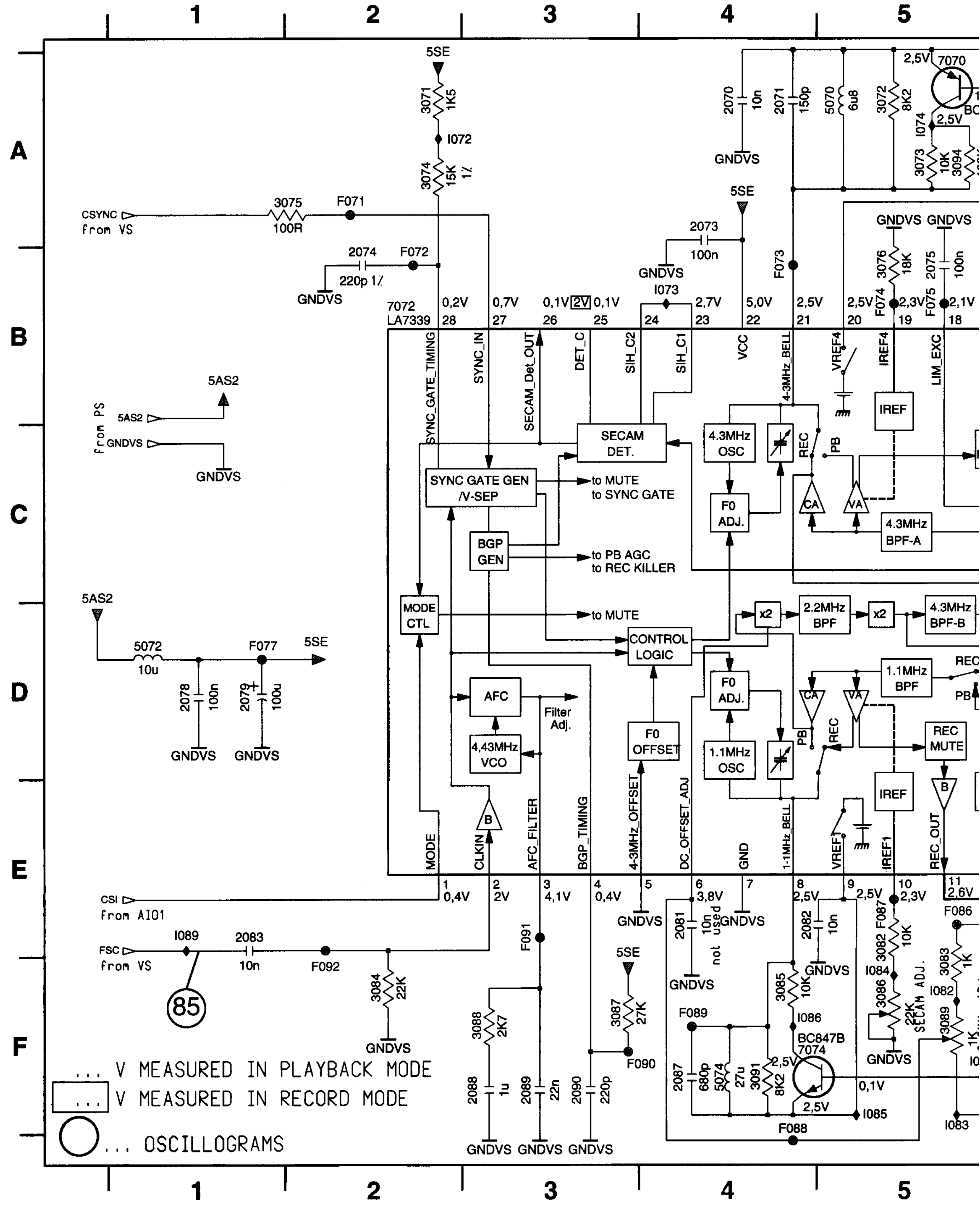

1
2
3
4
5
6
7
A
B
C
D
E
F
G
H
I
5VS1
5AS2
5003
10u
LAL04
220u
2051
GNDVS
5VS2
5007
10U
100u
2057
from PS
FSC to VSEC
5VS2
2000
100n
5,1V
7000
BC847B
2,5V
1,9V
3003
2K2
for VS_SEC only
2002
10n
CSP from VSEC
2003
10n
78
I013
2013
10n
GNDVS
3007
220K
1007
1K8
3002
1006
1004
2017
100n
3010
5K6
1000
HC-49/U
4M33619
2019
2p7
1008
2008
1u
3008
8K2
2015
47n
X7R
2009
1u
1065
3009
1K
2016
22n
X7R
2011
10n
2012
1u
1002
2014
100n
F001
F002
F003
1001
BGP
RL
2FSC/ PB-H OUT
C-GND
C-VCC
PQ2
KIL DET
PB APC DET
VXO
REC APC DET
AFC DET
AMP
VCO
INV
SLD
BPF
LPF
KIL B.D.
NPP
COMB
TH
ACK OUT
CKDET to AI01
3011
47K
SCL2 from AI01
SDA2 from AI01
SERIAL DECOD
PB BGA-A
PB BGA-B
N.L. DE-EM
DHP NC
PIC CTL
Y C MIX
CNC
1/2
SUB CONV
SUB BPF
BPF1
REC BGA
MAIN CONV
BPF2
ACC DET
ACC AMP
PQ1
3015
220K
not used
C-ROT IN
CROT from AI01
3016
47K
CSCP from AI01
CSCP_IN
PAL-PULSE
NC-CTL
2020
100n
X7R
C-LPF
KIL
FM AGC
SQ
PB-EQ
REC EQ
MOD
MAIN EMPH
N.L. EMPH
DETAIL EMPH
DOUBLE LIMIT
DEMOD
SUB LPF
FBC
CLP
BAL TC1
PM
REC HIGH OUT
PEAKING
MAIN EMPH
2031
10n
2034
1u
2036
100n
3021
330K
for 2/8 or 4/X BGIL
not used
3024
47K
2040
47u
7006
BC847B
2039
4u7
7009
BC847B
7008
BC857B
2049
4u7
CAGC from AI01
2050
100n
X7R
2042
10n
2043
10n
5009
100u
3026
100R
F011
71
72
73
69
70
F010
2041
22u
5002
150U
2044
22p
3020
15K
for 4/X 18k
3018
2K2
3022
680R
2045
390p
3019
270R
3023
1K3
2046
220p
2047
22p
not used
3027
4K7
7005
2035
4u7
3028
470R
2052
82p
5004
56U
5006
15U
2060
27p
5VS1
3030
680R
5005
47U
2054
39p
7011
BFS20
3033
680R
3035
680R
7012
BFS20
3031
1K
3037
470R
7013
BC847B
2055
100n
2059
10n
FMRV to HA
F012
3036
2K2
3034
2K2
CPRV to HA
FMPV from HA
for VS_SEC only
5008
100U
2061
220p
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
... OSCILLOGRAMS

Interconnections															
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	


7002
LC89980M
7004-B
LA71527M
NTSC
VCC2
YNR
CLP
LPF
VIDEO AMP
VIDEO AGC
QV/QH INS
SYNC SEPA
AGC DET
Y-VCC
REG
SAMPLE AND HOLD OUTPUT AMP
DL
CLOCK
SWITCHING CIRCUIT
CENTER BIAS
AUTO BIAS CIRCUIT 1
AUTO BIAS CIRCUIT 2
SYNC TIP CLAMP
WAVE SHAPER
PHASE COMP
1/3
VCO
CLOCK DRIVER
TIMING GENERATOR
RD VOLT GEN
GND
NT
CLK
VCC
NC
7503-A HEF4053BT
7503-B HEF4053BT
7503-C HEF4053BT
7501 BC857B
7502 BC857B
7003 BC857B
7504 BC857B
7505 BFS20
7010 BC847B
PDTA124ET 7007
6500 1N4148 not_used
1907
VFC
GNDVS
12A
AFRL
GNDAF
AFRR
From/to TV-Board 1999
12A from PS
CSYNC to AI01,VSEC
CSYNC2 to HA
VPDC to AF,CVB
VREC to VSEC
FFP from AI01
VFV1_2 from TU2
OS from AI02
VRUB to AF
VSCIN from AF
AFRL to AF,AL
AFRR to AF,AL
for AV-cinch only
74
75
76
77
79
80
81
82
5VS1
5AS2
GNDVS
GNDAF

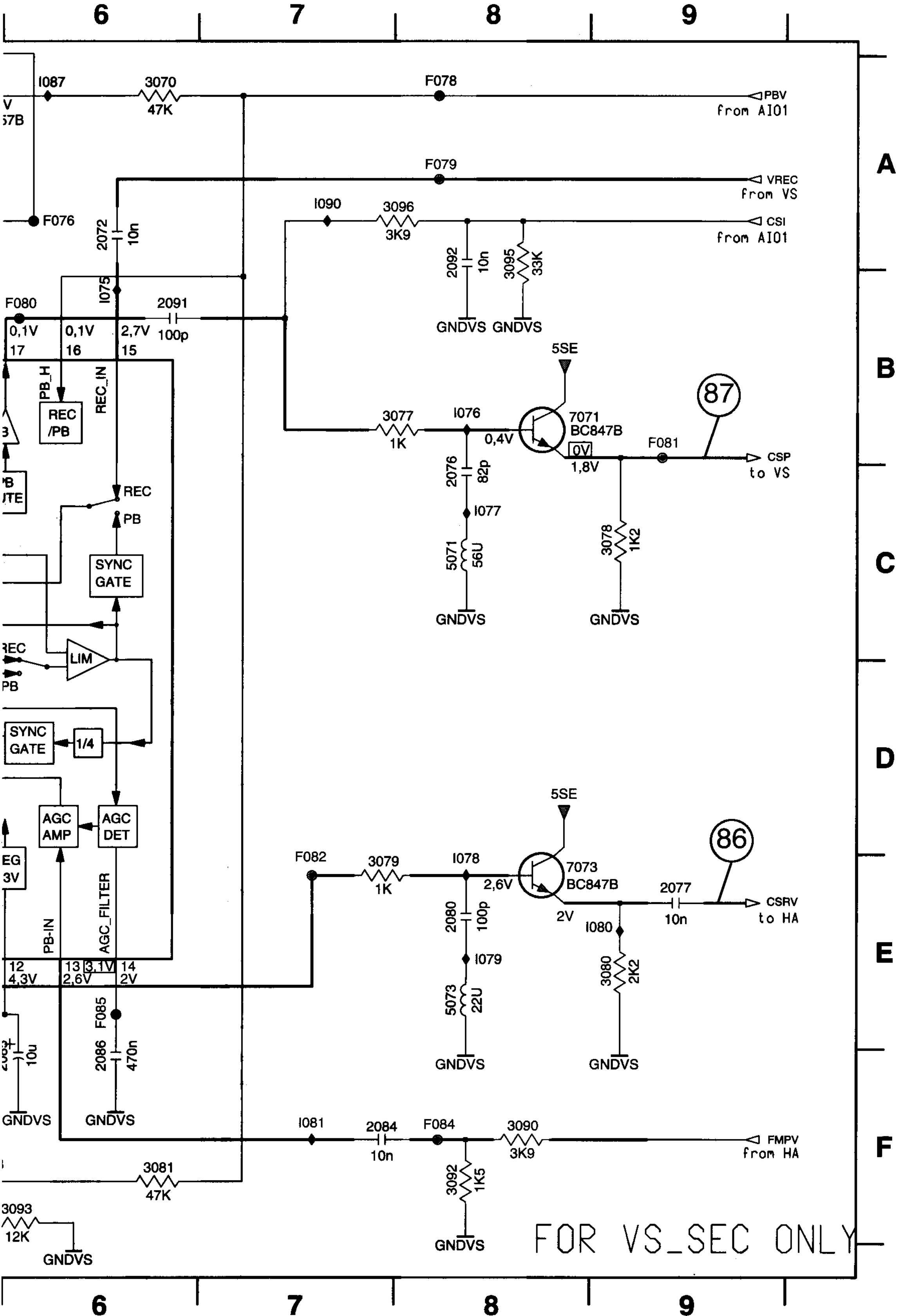
1000	B4
1907	H14
2000	A3
2001	I12
2002	A6
2003	A6
2004	A13
2005	A13
2006	I12
2008	B5
2009	B6
2010	A10
2011	B6
2012	B6
2013	B7
2014	B7
2015	B5
2016	B6
2017	B3
2018	B8
2019	B5
2020	C2
2021	C10
2022	C10
2023	C12
2024	C12
2025	C12
2026	D10
2027	E9
2028	E10
2029	F10
2030	F11
2031	F3
2032	G10
2033	F10
2034	F3
2035	F8
2036	G4
2037	G9
2038	G9
2039	G3
2040	G2
2041	G6
2042	G4
2043	G4
2044	G6
2045	G7
2046	G7
2047	G7
2048	G9
2049	G3
2050	H4
2051	A1
2052	H7
2053	I9
2054	H6
2055	I3
2056	I8
2057	B1
2058	I9
2059	I2
2060	I8
2061	I5
2501	G10
3002	A4
3003	A4
3007	B8
3008	B5
3009	B6
3010	B3
3011	C2
3012	C10
3013	C13
3014	C12
3015	D2
3016	E2
3017	D13
3018	F7
3019	F7
3020	G6
3021	G5
3022	G7
3023	G7
3024	G2
3025	G8
3026	G5
3027	G8
3028	H8
3029	I10
3030	H6
3031	H7
3032	I8
3033	I6
3034	I3
3035	I6
3036	I2
3037	I7
3038	I9
3041	E11
3501	D11
3502	D10
3503	D10
3504	D11
3505	G13
3506	G11
3507	G11
3508	F14
3509	H11
3510	G14
3511	H12
5001	C11
5002	G6
5003	A2
5004	I7
5005	H6
5006	I8
5007	B2
5008	I5
5009	H4
6500	H13
7000	A4
7002	A14
7003	C13
7004-B	B9
7005	G8
7006	G3
7007	H9
7008	H3
7009	H2
7010	I9
7011	I6
7012	I7
7013	I3
7501	D11
7502	D12
7503-A	E13
7503-B	F12
7503-C	I11
7504	G12
7505	G14
F001	B5
F002	B7
F003	B7
F004	C12
F005	D10
F006	D10
F007	G8
F008	F8
F009	F7
F010	G6
F011	H5
F012	I2
F013	I13
I001	B8
I002	B6
I004	B3
I005	D3
I006	B4
I007	A4
I008	B5
I010	B5
I011	B6
I012	C10
I013	A7
I014	B8
I015	A12
I016	A12
I017	A13
I018	A13
I019	C10
I020	C10
I021	D9
I022	C12
I023	C13
I024	C13
I025	A13
I026	C14
I027	C14
I028	E9
I029	E9
I030	F9
I031	F9
I032	F9
I033	F8
I034	I9
I035	I8
I036	I7
I037	I7
I038	H7
I039	H8
I040	H7
I041	G7
I042	G7
I043	G7
I044	G6
I045	G6
I046	G6
I047	I6
I048	I6
I049	H5
I050	I5
I051	F5
I052	F5
I053	G4
I054	G7
I055	I3
I056	H2
I057	G2
I058	G2
I059	G3
I060	G3
I061	G4
I062	G4
I063	F3
I064	E3
I065	B6
I066	I7
I067	F3
I068	F6
I069	F7
I070	C3
I091	I10
I092	E11
I093	E11
I501	D10
I502	D11
I503	D11
I504	D12
I505	F13
I507	G13
I508	G14
I510	G11

SECAM Processing (VSEC) - Recorder Unit Board (RUBAD)


1
2
3
4
5
A
B
C
D
E
F
5SE
3071 1K5
I072
3074 15K 1%
CSYNC from VS
3075 100R
F071
2074 220p 1%
F072
GNDVS
7072 LA7339
0,2V 28
0,7V 27
0,1V 2V 0,1V 26 25
I073 24
2,7V 23
5,0V 22
2,5V 21
2,5V 20
F074 2,3V 19
F075 2,1V 18
2070 10n
2071 150p
5070 6u8
3072 8K2
2,5V 7070
I074 2,5V
3073 10K
3094
2073 100n
F073
GNDVS GNDVS
3076 18K
2075 100n
SYNC_GATE_TIMING
SYNC_IN
SECAM_Det_OUT
DET_C
SIH_C2
SIH_C1
VCC
4-3MHz_BELL
VREF4
IREF4
LIM_EXC
5AS2 from PS
GNDVS
SECAM DET.
4.3MHz OSC
REC
PB
IREF
SYNC GATE GEN /V-SEP
to MUTE
to SYNC GATE
F0 ADJ.
CA
VA
4.3MHz BPF-A
BGP GEN
to PB AGC
to REC KILLER
MODE CTL
to MUTE
x2
2.2MHz BPF
x2
4.3MHz BPF-B
CONTROL LOGIC
5072 10u
F077
2078 100n
2079 100u
AFC
Filter Adj.
4,43MHz VCO
F0 ADJ.
1.1MHz BPF
F0 OFFSET
1.1MHz OSC
REC MUTE
B
MODE
CLKIN
AFC_FILTER
BGP_TIMING
4-3MHz_OFFSET
DC_OFFSET_ADJ
GND
1-1MHz_BELL
VREF1
IREF1
REC_OUT
1 0,4V
2 2V
3 4,1V
4 0,4V
5
6 3,8V
7
8 2,5V
9 2,5V
10 2,3V
11 2,6V
CSI from AI01
FSC from VS
I089
2083 10n
F092
85
3084 22K
F091
3088 2K7
2088 1u
2089 22n
2090 220p
3087 27K
F090
2081 10n not used
2082 10n
F087
3082 10K
I084
3086 22K SECAM ADJ.
F086
3083 1K
I082
3089 1K
3085 10K
I086
F089
2087 680p
5074 27u
3091 8K2
BC847B 7074
2,5V
0,1V
I085
F088
I083
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
... OSCILLOGRAMS

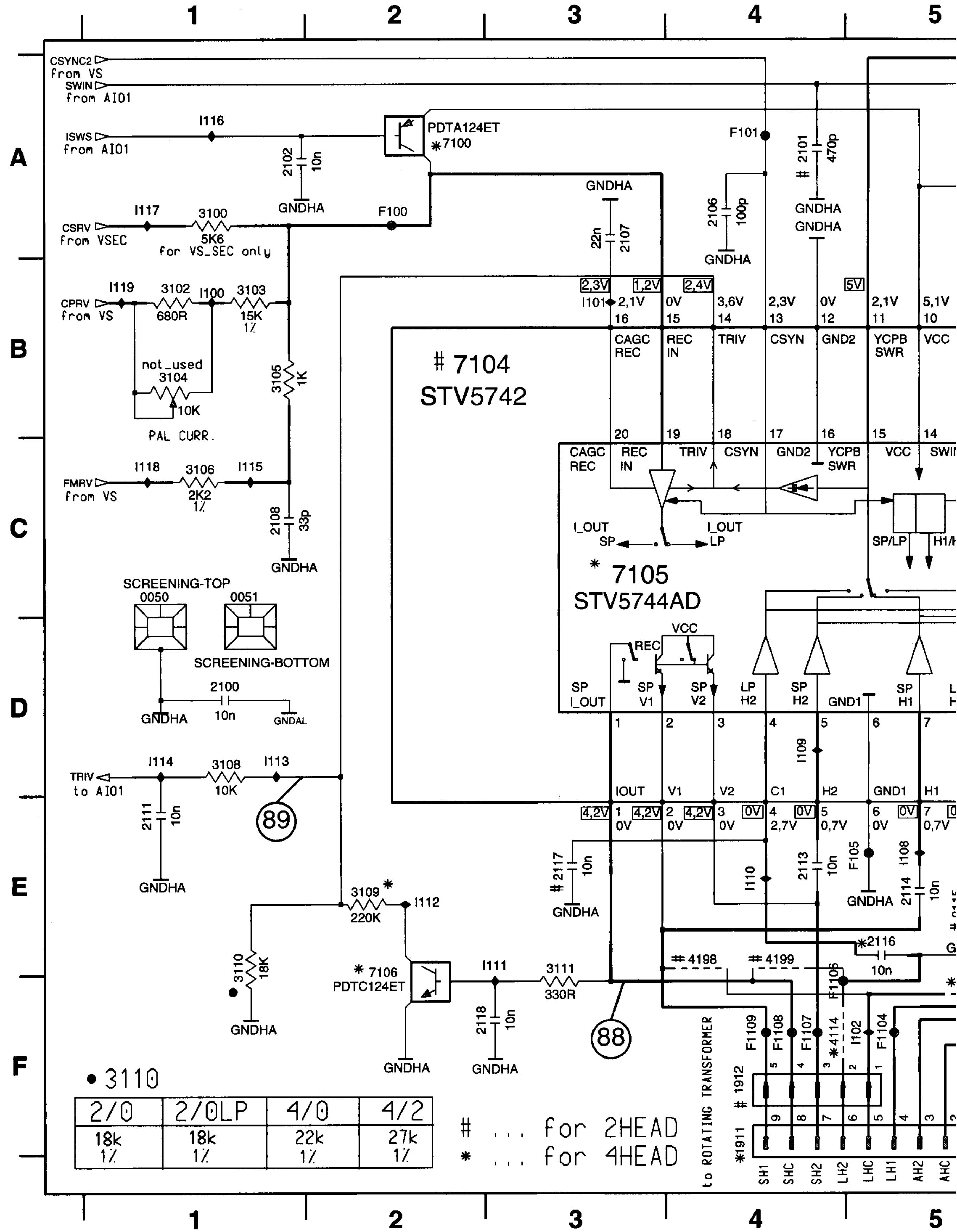
Interconnections

Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

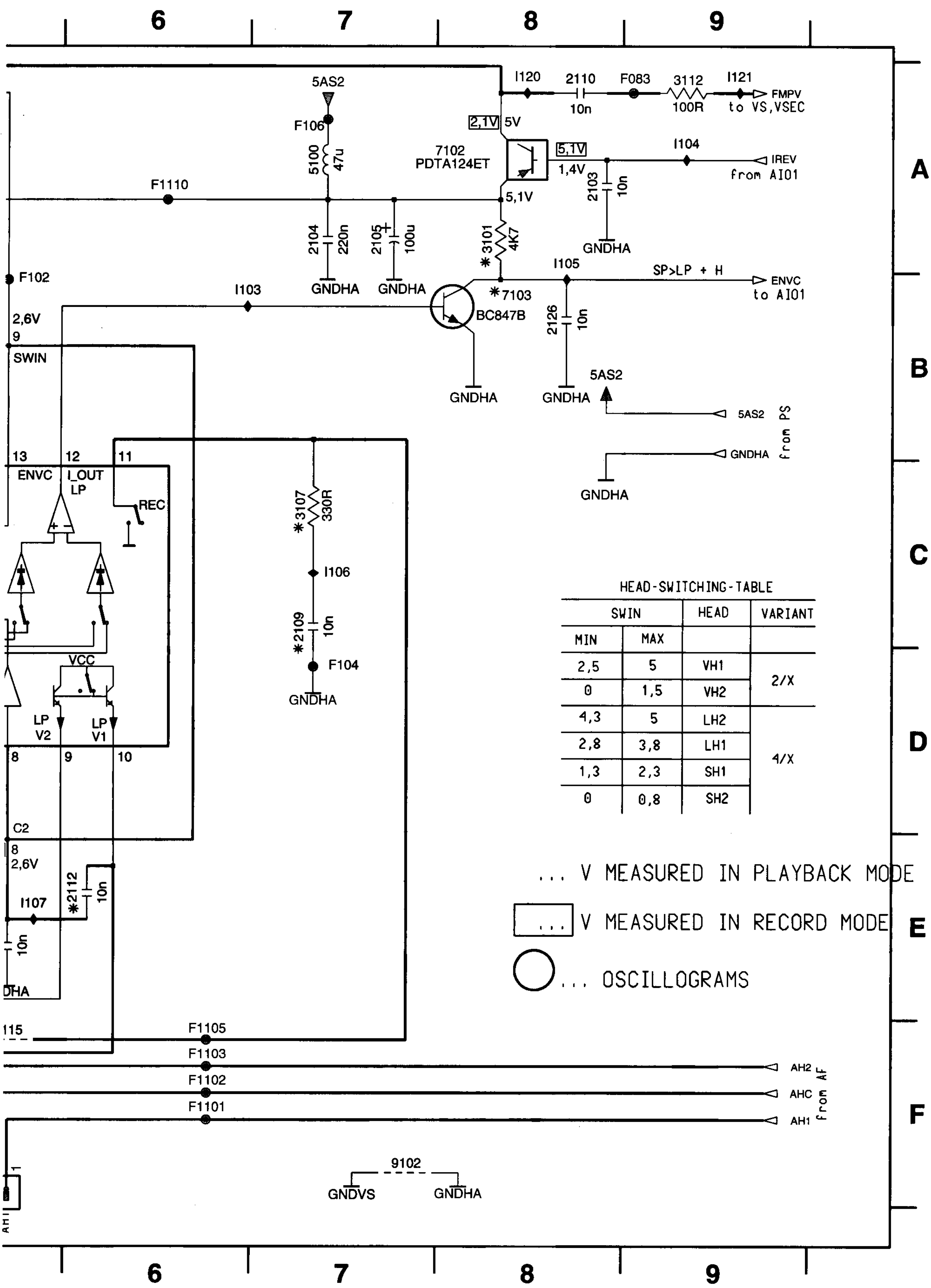

6
7
8
9
A
B
C
D
E
F
I087
3070
47K
F078
PBV
from AI01
V
57B
F079
VREC
from VS
I090
3096
3K9
CSI
from AI01
F076
2072
10n
2092
10n
3095
33K
GNDVS
GNDVS
I075
F080
2091
100p
0,1V
0,1V
2,7V
17
16
15
PB_H
REC_IN
REC
/PB
5SE
87
3077
1K
I076
7071
BC847B
0,4V
0V
1,8V
F081
CSP
to VS
2076
82p
I077
5071
56U
3078
1K2
GNDVS
GNDVS
PB
UTE
REC
PB
SYNC
GATE
REC
PB
LIM
SYNC
GATE
1/4
AGC
AMP
AGC
DET
EG
3V
PB-IN
AGC_FILTER
5SE
86
F082
3079
1K
I078
7073
BC847B
2,6V
2V
2077
10n
CSRV
to HA
2080
100p
I080
I079
3080
2K2
5073
22U
GNDVS
GNDVS
12
4,3V
13
2,6V
3,1V
14
2V
F085
2086
470n
10u
GNDVS
GNDVS
I081
2084
10n
F084
3090
3K9
FMPV
from HA
3081
47K
3092
1K5
3093
12K
GNDVS
GNDVS
FOR VS_SEC ONLY

2070	A4
2071	A4
2072	A6
2073	A4
2074	B2
2075	B5
2076	C8
2077	E9
2078	D1
2079	D1
2080	E8
2081	E4
2082	E4
2083	E1
2084	F7
2085	F6
2086	F6
2087	F4
2088	F3
2089	F3
2090	F3
2091	B6
2092	A8
3070	A6
3071	A2
3072	A5
3073	A5
3074	A2
3075	A2
3076	B5
3077	B8
3078	C9
3079	E7
3080	E9
3081	F6
3082	E5
3083	F5
3084	F2
3085	F4
3086	F5
3087	F3
3088	F3
3089	F5
3090	F8
3091	F4
3092	F8
3093	F6
3094	A5
3095	A8
3096	A8
5070	A5
5071	C8
5072	D1
5073	E8
5074	F4
7070	A5
7071	B8
7072	B2
7073	E8
7074	F5
F071	A2
F072	B2
F073	B4
F074	B5
F075	B5
F076	A6
F077	D1
F078	A8
F079	A8
F080	B6
F081	B9
F082	D7
F084	F8
F085	E6
F086	E5
F087	E5
F088	F4
F089	F4
F090	F4
F091	E3
F092	F2
I072	A2
I073	B4
I074	A5
I075	B6
I076	B8
I077	C8
I078	E8
I079	E8
I080	E9
I081	F7
I082	F5
I083	F5
I084	F5
I085	F5
I086	F4
I087	A6
I088	F5
I089	E1
I090	A7

Head Amplifier (HA) - Recorder Unit Board (RUBAD)


1
2
3
4
5
A
B
C
D
E
F
CSYNC2
from VS
SWIN
from AI01
ISWS
from AI01
I116
2102
10n
GNDHA
PDTA124ET
*7100
CSRV
from VSEC
I117
3100
5K6
for VS_SEC only
F100
CPRV
from VS
I119
3102
680R
I100
3103
15K
1%
not_used
3104
10K
PAL CURR.
3105
1K
FMRV
from VS
I118
3106
2K2
1%
I115
2108
33p
SCREENING-TOP
0050
0051
SCREENING-BOTTOM
2100
10n
GNDAL
TRIV
to AI01
I114
3108
10K
I113
89
2111
10n
3109*
220K
I112
3110
18K
* 7106
PDTC124ET
I111
3111
330R
2118
10n
88
GNDHA
22n
2107
F101
2106
100p
# 2101
470p
2,3V
1,2V
2,4V
5V
I101
2,1V
0V
3,6V
2,3V
0V
2,1V
5,1V
16
15
14
13
12
11
10
CAGC REC
REC IN
TRIV
CSYN
GND2
YCPB SWR
VCC
# 7104
STV5742
20
19
18
17
16
15
14
CAGC REC
REC IN
TRIV
CSYN
GND2
YCPB SWR
VCC
SWI
I_OUT SP
I_OUT LP
SP/LP
H1/H
* 7105
STV5744AD
VCC
REC
SP I_OUT
SP V1
SP V2
LP H2
SP H2
GND1
SP H1
1
2
3
4
5
6
7
IOUT
V1
V2
C1
H2
GND1
H1
4,2V
4,2V
4,2V
0V
0V
0V
1 0V
2 0V
3 0V
4 2,7V
5 0,7V
6 0V
7 0,7V
I109
# 2117
10n
I110
2113
10n
F105
I108
2114
10n
*2116
10n
# 4198
# 4199
F1106
F1109
F1108
F1107
*4114
I102
F1104
to ROTATING TRANSFORMER
# 1912
*1911
5
4
3
2
1
9
8
7
6
5
4
3
SH1
SHC
SH2
LH2
LHC
LH1
AH2
AHC
• 3110
2/0 | 2/0LP | 4/0 | 4/2
18k 1% | 18k 1% | 22k 1% | 27k 1%
# ... for 2HEAD
* ... for 4HEAD

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	


6
7
8
9
A
B
C
D
E
F
5AS2
F106
5100
47u
F1110
2104
220n
2105
100u
GNDHA
I120
2110
10n
F083
3112
100R
I121
FMPV
to VS,VSEC
2,1V
5V
7102
PDTA124ET
5,1V
1,4V
I104
IREV
from AI01
2103
10n
5,1V
3101
4K7
I105
SP>LP + H
ENVC
to AI01
7103
BC847B
2126
10n
I103
F102
2,6V
9
SWIN
13
12
11
ENVC
I_OUT
LP
REC
VCC
LP
V2
LP
V1
8
9
10
C2
8
2,6V
I107
2112
10n
10n
DHA
3107
330R
I106
2109
10n
F104
GNDHA
5AS2
GNDHA
from PS
115
F1105
F1103
F1102
F1101
AH2
AHC
AH1
from AF
9102
GNDVS
GNDHA
1

HEAD-SWITCHING-TABLE

SWIN		HEAD	VARIANT
MIN	MAX		
2,5	5	VH1	2/X
0	1,5	VH2	
4,3	5	LH2	4/X
2,8	3,8	LH1	
1,3	2,3	SH1	
0	0,8	SH2	

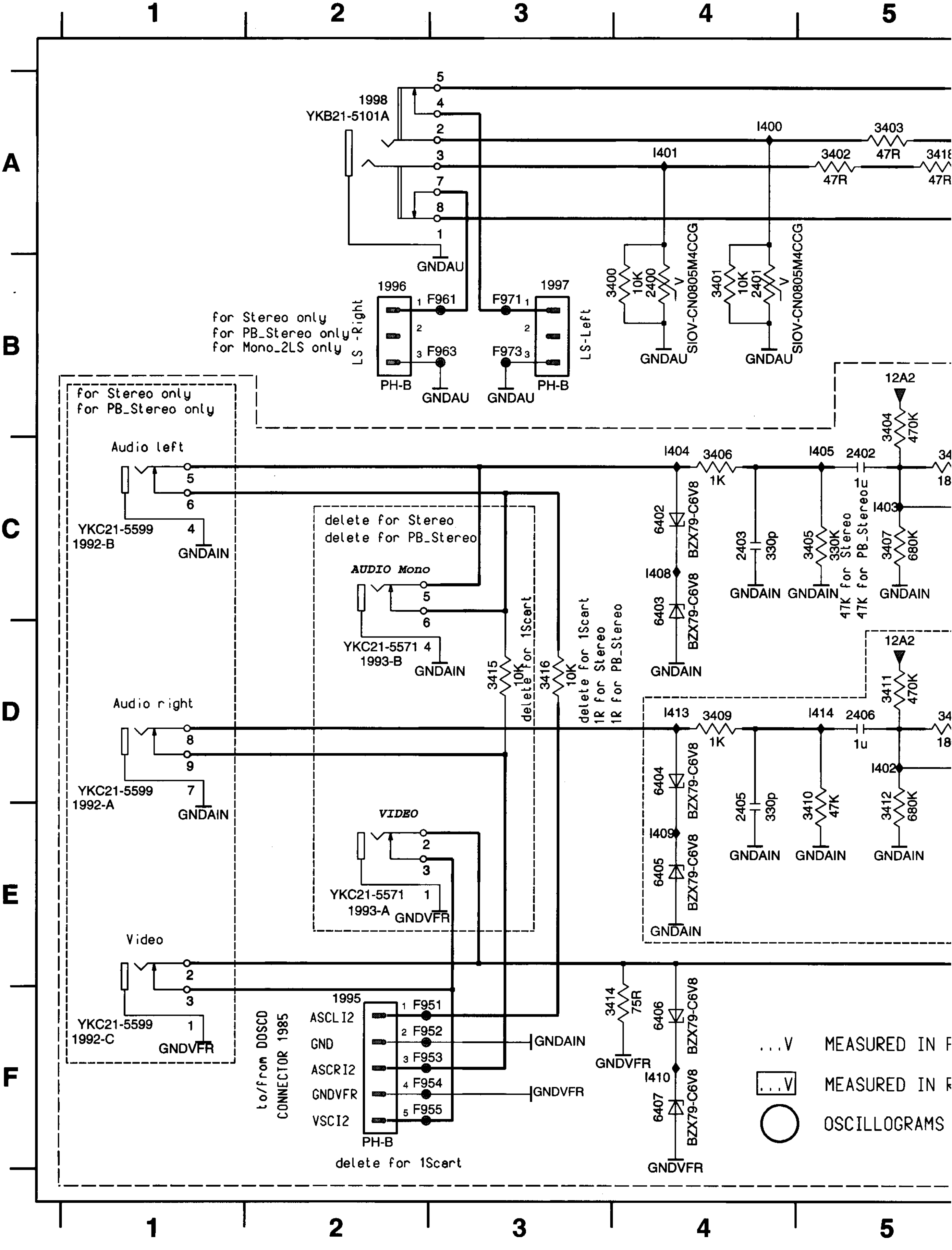
... V MEASURED IN PLAYBACK MODE

$\boxed{\ldots}$ V MEASURED IN RECORD MODE

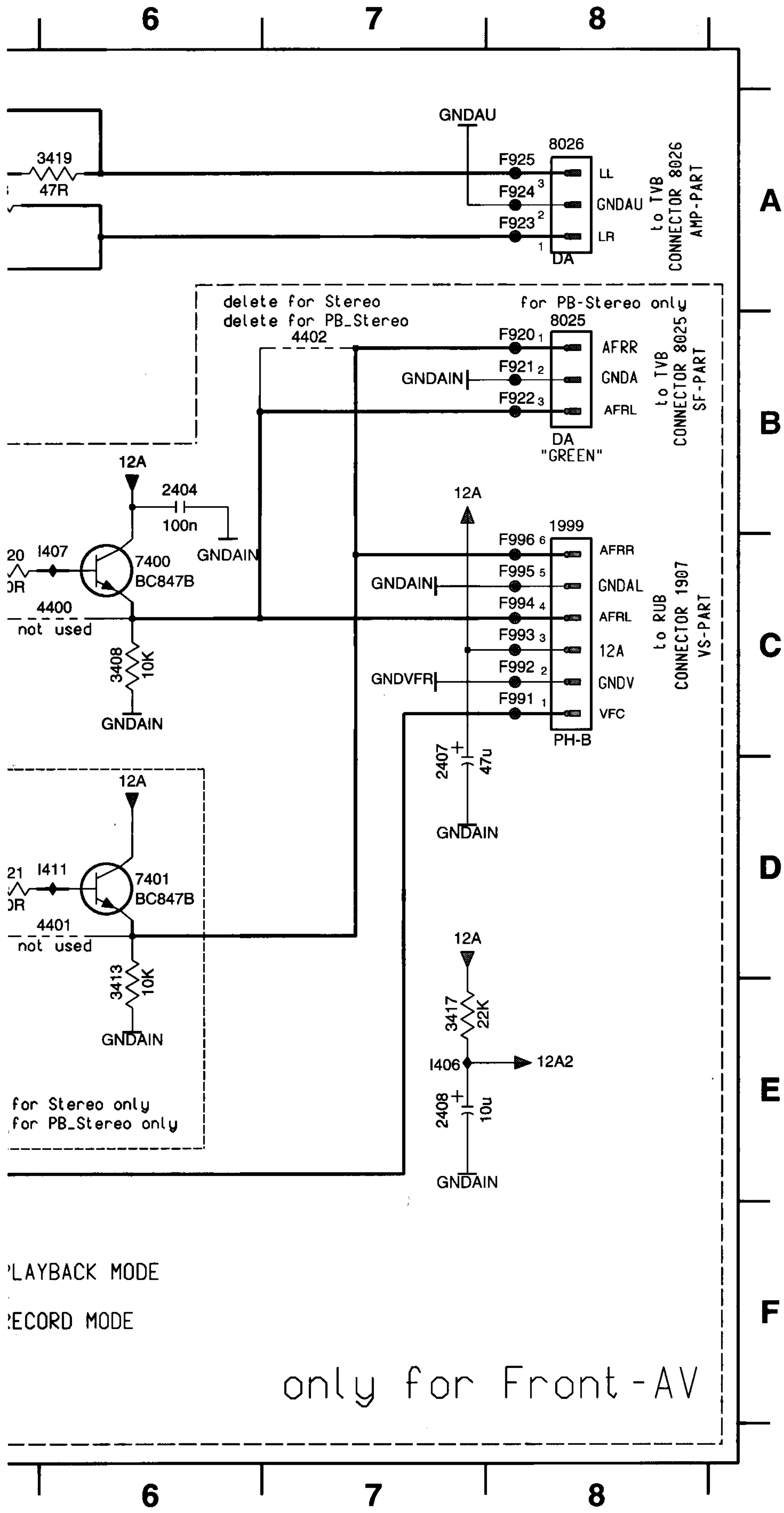
○ ... OSCILLOGRAMS

0050	C1
0051	C1
1911	F4
1912	F4
2100	D1
2101	A4
2102	A1
2103	A8
2104	A7
2105	A7
2106	A4
2107	A3
2108	C1
2109	C7
2110	A8
2111	E1
2112	E6
2113	E4
2114	E5
2115	E5
2116	E5
2117	E3
2118	F2
2126	B8
3100	A1
3101	A8
3102	B1
3103	B1
3104	B1
3105	B1
3106	C1
3107	C7
3108	D1
3109	E2
3110	E1
3111	E3
3112	A9
4114	F4
4115	F5
4198	E4
4199	E4
5100	A7
7100	A2
7102	A8
7103	B8
7104	B2
7105	C3
7106	F2
9102	F7
F083	A9
F100	A2
F101	A4
F102	B5
F104	D7
F105	E5
F106	A7
F1101	F6
F1102	F6
F1103	F6
F1104	F5
F1105	F6
F1106	F4
F1107	F4
F1108	F4
F1109	F4
F1110	A6
I100	B1
I101	B3
I102	F5
I103	B6
I104	A9
I105	A8
I106	C7
I107	E5
I108	E5
I109	D4
I110	E4
I111	E3
I112	E2
I113	D1
I114	D1
I115	C1
I116	A1
I117	A1
I118	C1
I119	B1
I120	A8
I121	A9

Headphone, Front-AV Board (HPAV)


1
2
3
4
5
A
B
C
D
E
F
1998
YKB21-5101A
5
4
2
3
7
8
1
GNDAU
1400
1401
3403
47R
3402
47R
3418
47R
3400
10K
2400
3401
10K
2401
SIOV-CN0805M4CCG
GNDAU
1996
1997
F961
F971
F963
F973
LS -Right
LS-Left
PH-B
GNDAU
for Stereo only
for PB_Stereo only
for Mono_2LS only
for Stereo only
for PB_Stereo only
Audio left
YKC21-5599
1992-B
GNDAIN
1404
3406
1K
1405
2402
1u
1403
12A2
3404
470K
6402
BZX79-C6V8
1408
6403
2403
330p
3405
330K
47K for Stereo
47K for PB_Stereo
3407
680K
GNDAIN
delete for Stereo
delete for PB_Stereo
AUDIO Mono
YKC21-5571
1993-B
3415
10K
delete for 1Scart
3416
10K
delete for 1Scart
1R for Stereo
1R for PB_Stereo
Audio right
YKC21-5599
1992-A
1413
3409
1K
1414
2406
1u
1402
3411
470K
6404
1409
6405
2405
330p
3410
47K
3412
680K
VIDEO
YKC21-5571
1993-A
GNDVFR
Video
YKC21-5599
1992-C
1995
F951
F952
F953
F954
F955
ASCLI2
GND
ASCRI2
GNDVFR
VSCI2
to/from DOSCD
CONNECTOR 1985
PH-B
delete for 1Scart
GNDAIN
GNDVFR
3414
75R
6406
1410
6407
...V MEASURED IN
...V MEASURED IN
OSCILLOGRAMS

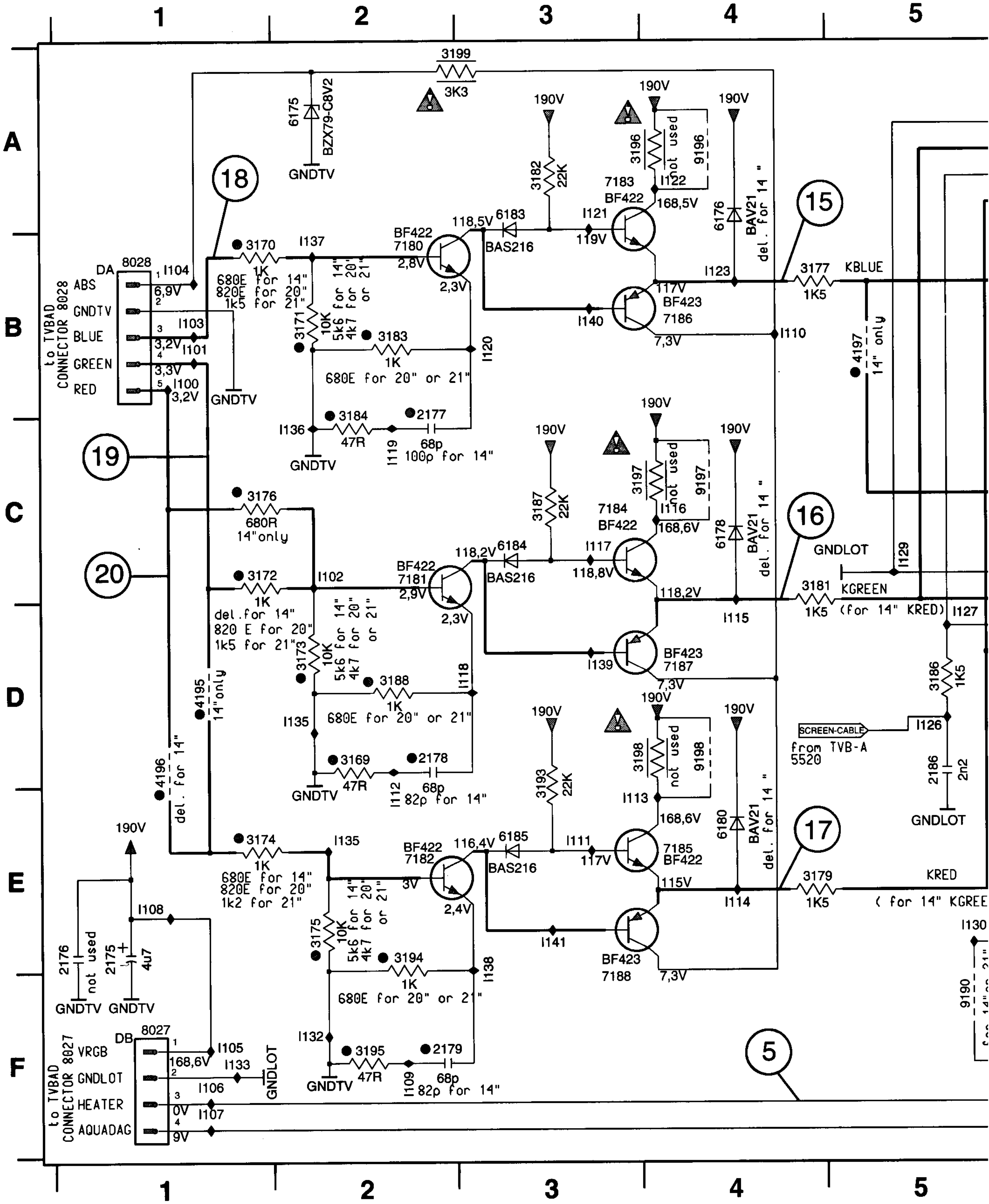
Interconnections															
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	


6
7
8
A
B
C
D
E
F
GNDAU
8026
F925
F924
F923
3
2
1
LL
GNDAU
LR
DA
to TVB
CONNECTOR 8026
AMP-PART
3419
47R
delete for Stereo
delete for PB_Stereo
4402
for PB-Stereo only
8025
F920 1
F921 2
F922 3
AFRR
GNDA
AFRL
GNDAIN
DA
"GREEN"
to TVB
CONNECTOR 8025
SF-PART
12A
2404
100n
GNDAIN
20
I407
7400
BC847B
4400
not used
3408
10K
GNDAIN
12A
1999
F996 6
F995 5
F994 4
F993 3
F992 2
F991 1
AFRR
GNDAL
AFRL
12A
GNDV
VFC
GNDAIN
GNDVFR
PH-B
to RUB
CONNECTOR 1907
VS-PART
2407
47u
GNDAIN
12A
21
I411
7401
BC847B
4401
not used
3413
10K
GNDAIN
12A
3417
22K
I406
12A2
2408
10u
GNDAIN
for Stereo only
for PB_Stereo only
LAYBACK MODE
ECORD MODE
only for Front-AV

1992-A	D1
1992-B	C1
1992-C	F1
1993-A	E2
1993-B	D2
1995	F2
1996	B2
1997	B3
1998	A2
1999	B8
2400	B4
2401	B4
2402	C5
2403	C4
2404	B6
2405	E4
2406	D5
2407	D7
2408	E7
3400	B4
3401	B4
3402	A5
3403	A5
3404	B5
3405	C5
3406	C4
3407	C5
3408	C6
3409	D4
3410	E5
3411	D5
3412	E5
3413	E6
3414	F4
3415	D3
3416	D3
3417	E7
3418	A5
3419	A6
3420	C5
3421	D5
4400	C6
4401	D6
4402	B7
6402	C4
6403	C4
6404	D4
6405	E4
6406	F4
6407	F4
7400	C6
7401	D6
8025	B8
8026	A8
F920	B8
F921	B8
F922	B8
F923	A8
F924	A8
F925	A8
F951	F2
F952	F2
F953	F2
F954	F2
F955	F2
F961	B3
F963	B3
F971	B3
F973	B3
F991	C8
F992	C8
F993	C8
F994	C8
F995	C8
F996	C8
I400	A4
I401	A4
I402	D5
I403	C5
I404	C4
I405	C5
I406	E7
I407	C6
I408	C4
I409	E4
I410	F4
I411	D6
I413	D4
I414	D5

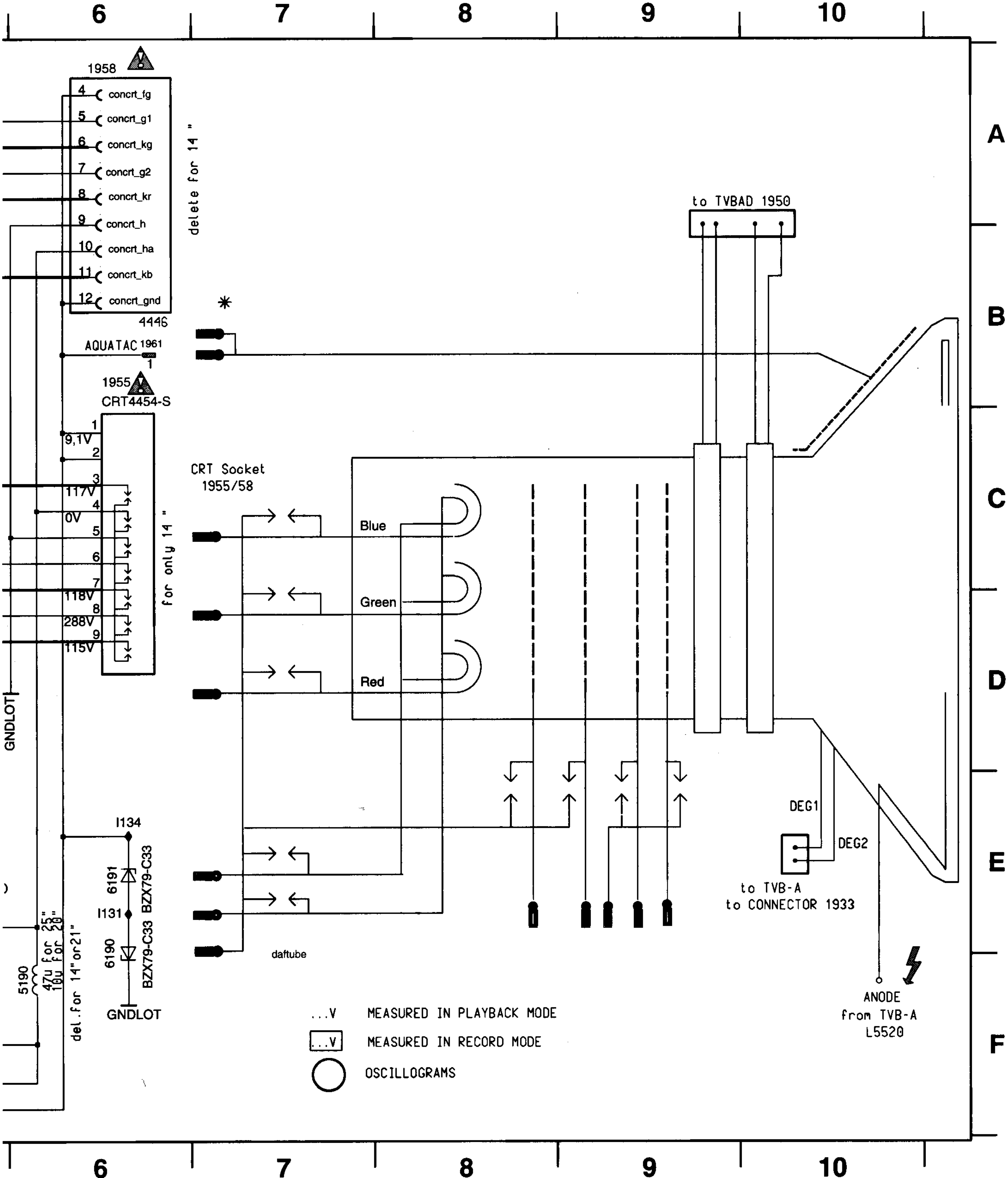
CRT-Board (PT)

1955 B6
1958-A A6
1958-B A6
1958-C A6
1958-D A6
1958-E B6
1958-F A6
1958-G B6
1958-H B6
1958-I A6
1961 B6
2175 E1
2176 E1
2177 C2
2178 D2
2179 F2
2186 D5
3169 D2
3170 B1
3171 B2
3172 C1
3173 D2
3174 E1
3175 E2
3176 C1
3177 B4
3179 E4
3181 C4
3182 A3
3183 B2
3184 C2
3186 D5
3187 C3
3188 D2
3193 D3
3194 E2
3195 F2
3196 A4
3197 C4
3198 D4
3199 A3
4195 D1
4196 D1
4197 B5
5190 F6
6175 A2
6176 A4
6178 C4
6180 E4
6183 A3
6184 C3
6185 E3
6190 E
6191 E
7180 E
7181 C

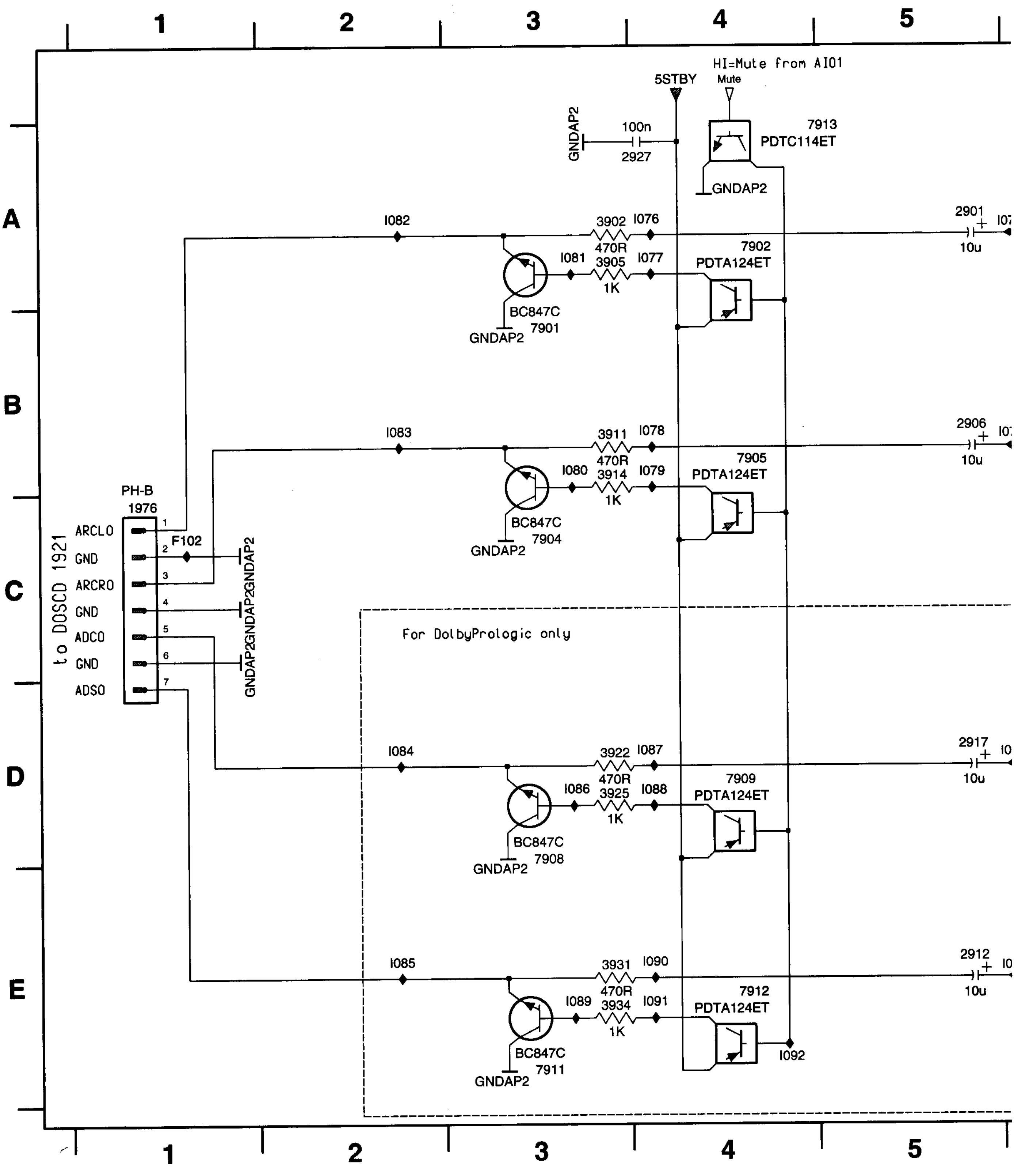

1
2
3
4
5
A
B
C
D
E
F
3199
3K3
6175
BZX79-C8V2
GNDTV
190V
3182
22K
3196
not used
9196
7183
BF422
I122
168,5V
6176
BAV21
del. for 14"
15
18
DA
8028
to TVBAD CONNECTOR 8028
ABS
GNDTV
BLUE
GREEN
RED
I104
6,9V
I103
3,2V
I101
3,3V
I100
3,2V
3170
1K
680E for 14"
820E for 20"
1k5 for 21"
I137
BF422
7180
2,8V
2,3V
118,5V
6183
BAS216
I121
119V
I123
117V
3177
1K5
KBLUE
BF423
7186
I140
7,3V
I110
3171
10K
5k6 for 14"
4k7 for 20" or 21"
3183
1K
680E for 20" or 21"
I120
4197
14" only
I136
3184
47R
2177
68p
100p for 14"
I119
19
3176
680R
14"only
3187
3197
9197
7184
I116
168,6V
6178
16
GNDLOT
I129
3172
I102
del.for 14"
820 E for 20"
1k5 for 21"
7181
2,9V
118,2V
6184
I117
118,8V
118,2V
3181
KGREEN
(for 14" KRED)
I127
I115
3173
3188
I118
BF423
7187
I139
3186
1K5
SCREEN-CABLE
from TVB-A
5520
I126
2186
2n2
I135
3169
2178
68p
82p for 14"
I112
4195
14"only
4196
del. for 14"
20
3193
3198
9198
I113
6180
17
3174
680E for 14"
820E for 20"
1k2 for 21"
I135
BF422
7182
3V
2,4V
116,4V
6185
I111
117V
7185
115V
3179
KRED
(for 14" KGREE
I114
I141
7188
I130
9190
3175
3194
I138
2176
not used
2175
4u7
I108
I132
3195
2179
I109
DB
8027
to TVBAD CONNECTOR 8027
VRGB
GNDLOT
HEATER
AQUADAG
I105
168,6V
I133
I106
0V
I107
9V
5

Interconnections															
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

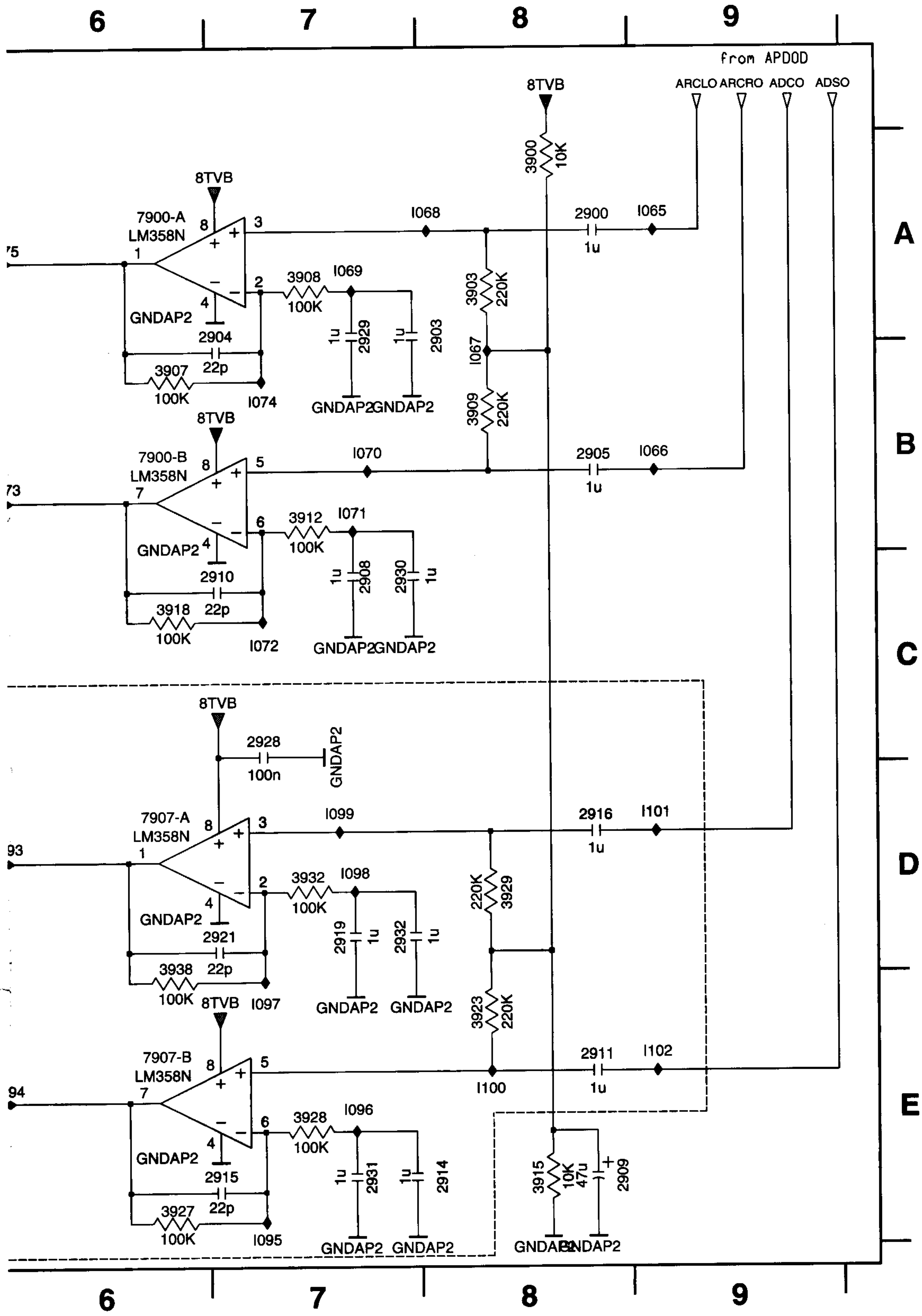
7182	E2
7183	A3
7184	C3
7185	E4
7186	B4
7187	D4
7188	E3
8027	F1
8028	B1
9190	F5
9196	A4
9197	C4
9198	D4
I100	B1
I101	B1
I102	C2
I103	B1
I104	B1
I105	F1
I106	F1
I107	F1
I108	E1
I109	F2
I110	B4
I111	E3
I112	E2
I113	E3
I114	E4
I115	D4
I116	C4
I117	C3
I118	D3
I119	C2
I120	B3
I121	A3
I122	A4
I123	B4
I125	D2
I126	D5
I127	D5
I129	C5
I130	E5
I131	E6
I132	F2
I133	F1
I134	E6
I135	E2
I136	C2
I137	B2
I138	E3
I139	D3
I140	B3
I141	E3
SCREEN	D5


6
7
8
9
10
A
B
C
D
E
F
1958
4 concrt_fg
5 concrt_g1
6 concrt_kg
7 concrt_g2
8 concrt_kr
9 concrt_h
10 concrt_ha
11 concrt_kb
12 concrt_gnd
4446
delete for 14 "
AQUATAC 1961
1
1955
CRT4454-S
1 9,1V
2
3 117V
4 0V
5
6
7 118V
8 288V
9 115V
for only 14 "
GNDLOT
*
CRT Socket
1955/58
Blue
Green
Red
daftube
to TVBAD 1950
DEG1
DEG2
to TVB-A
to CONNECTOR 1933
ANODE
from TVB-A
L5520
I134
6191
BZX79-C33
I131
6190
BZX79-C33
GNDLOT
5190
47u for 25"
10u for 28"
del.for 14"or21"
...V MEASURED IN PLAYBACK MODE
...V MEASURED IN RECORD MODE
OSCILLOGRAMS

Pre Amplifier (ACO) - Audio Board (APDOD)

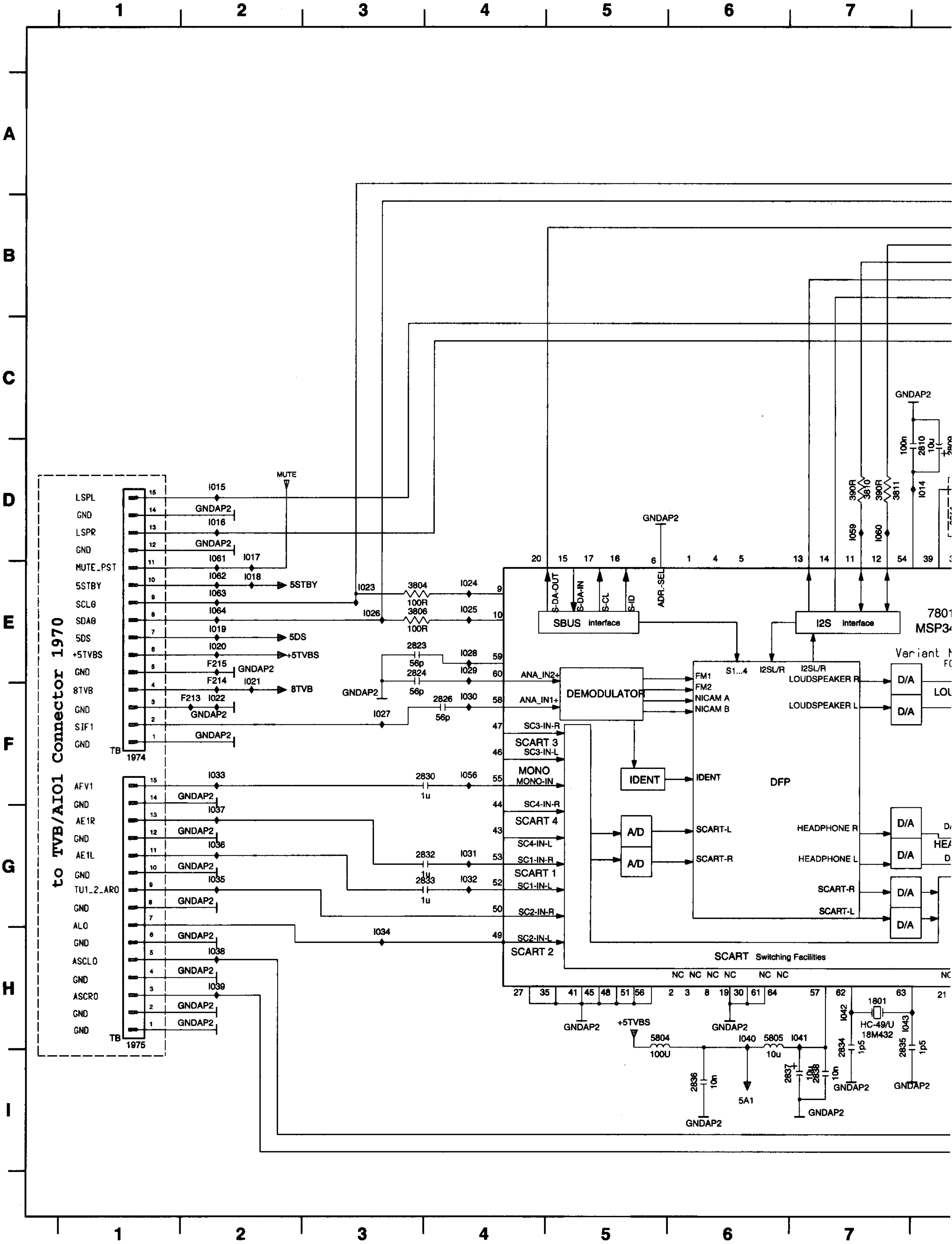

1
2
3
4
5
A
B
C
D
E
HI=Mute from AI01
Mute
5STBY
GNDAP2
100n
2927
7913
PDTC114ET
GNDAP2
I082
3902
I076
470R
2901
10u
I081
3905
I077
1K
7902
PDTA124ET
BC847C
7901
GNDAP2
I083
3911
I078
470R
2906
10u
I080
3914
I079
1K
7905
PDTA124ET
BC847C
7904
GNDAP2
PH-B
1976
to DOSCD 1921
ARCLO
GND
ARCRO
GND
ADCO
GND
ADSO
1
2
3
4
5
6
7
F102
GNDAP2
GNDAP2
GNDAP2
For DolbyPrologic only
I084
3922
I087
470R
2917
10u
I086
3925
I088
1K
7909
PDTA124ET
BC847C
7908
GNDAP2
I085
3931
I090
470R
2912
10u
I089
3934
I091
1K
7912
PDTA124ET
BC847C
7911
GNDAP2
I092

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

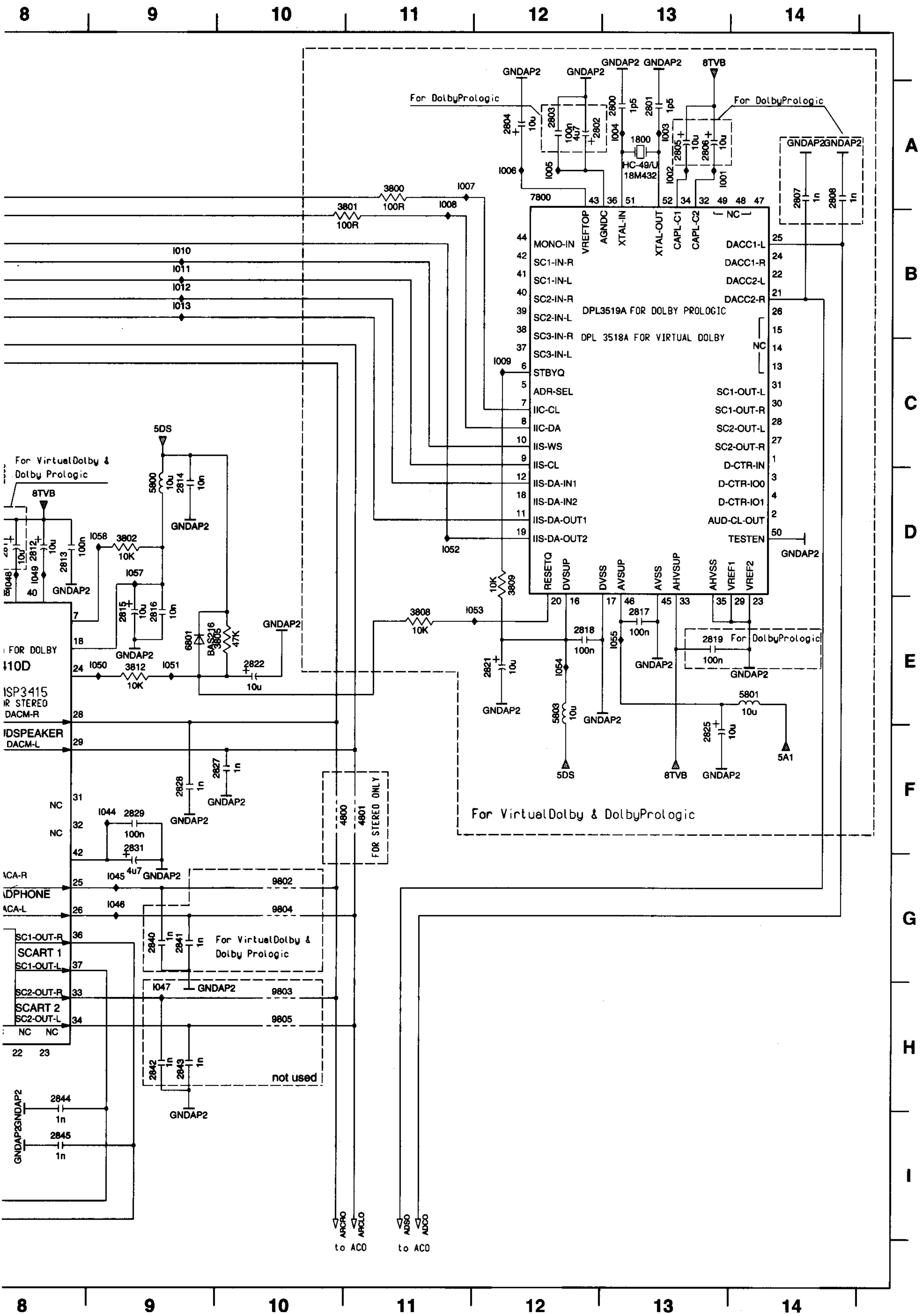

6
7
8
9
from APDOD
ARCLO
ARCRO
ADCO
ADSO
8TVB
3900
10K
8TVB
7900-A
LM358N
75
1
8
3
4
2
GNDAP2
I068
2900
1u
I065
3908
100K
I069
3903
220K
1u
2929
1u
2903
2904
22p
3907
100K
I074
I067
GNDAP2
GNDAP2
3909
220K
8TVB
7900-B
LM358N
73
7
8
5
4
6
GNDAP2
I070
2905
1u
I066
3912
100K
I071
1u
2908
2930
1u
2910
22p
3918
100K
I072
GNDAP2
GNDAP2
8TVB
2928
100n
GNDAP2
7907-A
LM358N
93
1
8
3
4
2
GNDAP2
I099
2916
1u
I101
3932
100K
I098
220K
3929
2919
1u
2932
1u
2921
22p
3938
100K
I097
GNDAP2
GNDAP2
3923
220K
8TVB
7907-B
LM358N
94
7
8
5
4
6
GNDAP2
I100
2911
1u
I102
3928
100K
I096
1u
2931
1u
2914
2915
22p
3927
100K
I095
GNDAP2
GNDAP2
3915
10K
47u
2909
GNDAP2
GNDAP2
A
B
C
D
E
6
7
8
9

1976	C1
2900	A8
2901	A5
2903	A7
2904	B7
2905	B8
2906	B5
2908	C7
2909	E8
2910	C7
2911	E8
2912	E5
2914	E7
2915	E7
2916	D8
2917	D5
2919	D7
2921	D7
2927	A4
2928	C7
2929	A7
2930	C7
2931	E7
2932	D7
3900	A8
3902	A3
3903	A8
3905	A3
3907	B6
3908	A7
3909	B8
3911	B3
3912	B7
3914	B3
3915	E8
3918	C6
3922	D3
3923	E8
3925	D3
3927	E6
3928	E7
3929	D8
3931	E3
3932	D7
3934	E3
3938	E6
7900-A	A6
7900-B	B6
7901	A3
7902	A4
7904	B3
7905	C4
7907-A	D6
7907-B	E6
7908	D3
7909	D4
7911	E3
7912	E4
7913	A4
F102	C1
I065	A9
I066	B9
I067	B8
I068	A8
I069	A7
I070	B7
I071	B7
I072	C7
I073	B6
I074	B7
I075	A6
I076	A4
I077	A4
I078	B4
I079	B4
I080	B3
I081	A3
I082	A2
I083	B2
I084	D2
I085	E2
I086	D3
I087	D4
I088	D4
I089	E3
I090	E4
I091	E4
I092	E4
I093	D6
I094	E6
I095	E7
I096	E7
I097	E7
I098	D7
I099	D7
I100	E8
I101	D9
I102	E9

Audio Processing (AF2) - Audio Board (APDOD)

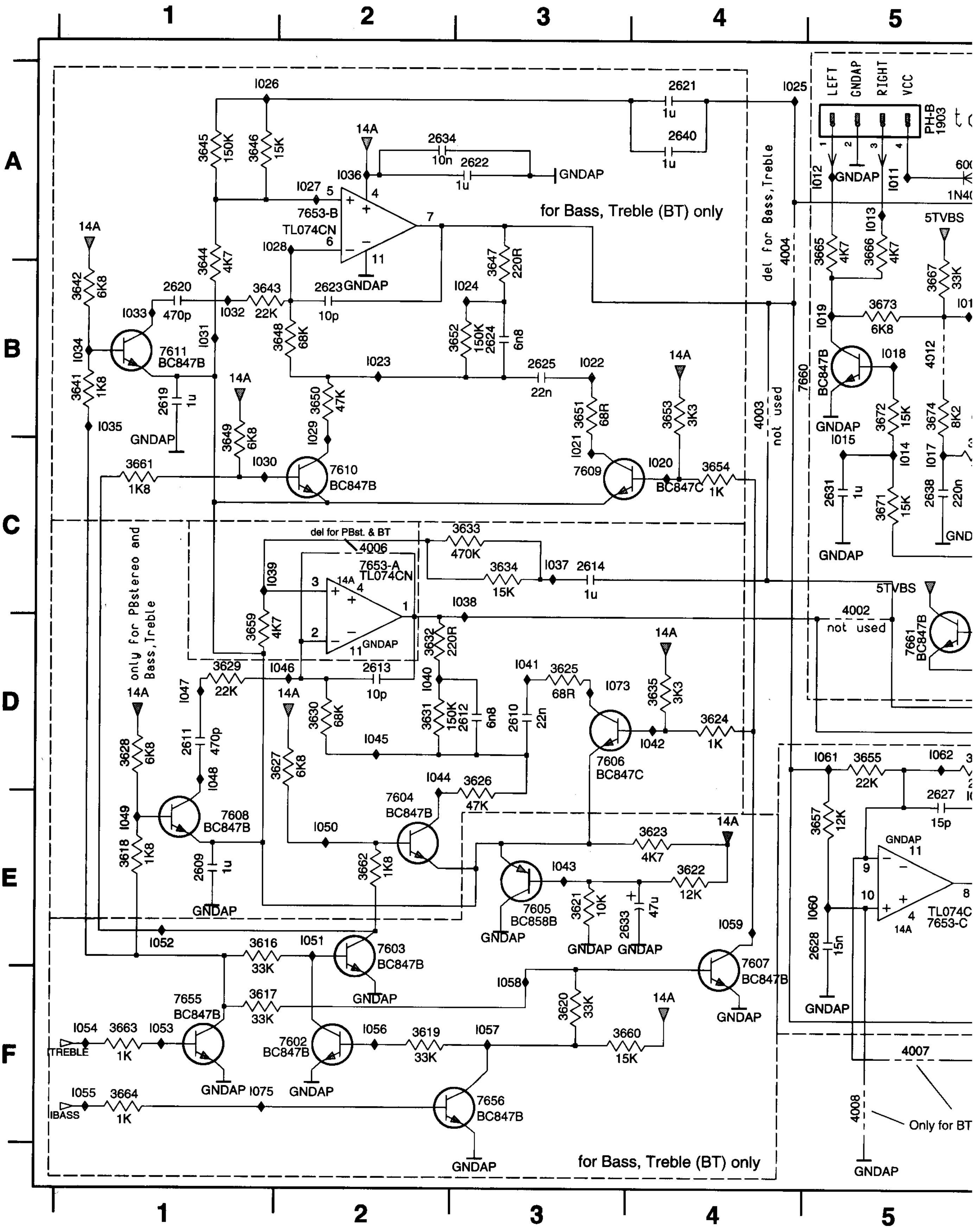

1
2
3
4
5
6
7
A
B
C
D
E
F
G
H
I
to TVB/AIO1 Connector 1970
LSPL
GND
LSPR
GND
MUTE_PST
5STBY
SCL0
SDA0
5DS
+5TVBS
GND
8TVB
GND
SIF1
GND
TB
1974
AFV1
GND
AE1R
GND
AE1L
GND
TU1_2_ARO
GND
ALO
GND
ASCLO
GND
ASCRO
GND
GND
TB
1975
MUTE
I015
GNDAP2
I016
I061
I017
I062
I018
5STBY
I063
I064
I019
5DS
I020
+5TVBS
F215
F214
I021
8TVB
F213
I022
I023
I026
3804
100R
3806
100R
I024
I025
2823
56p
2824
56p
2826
56p
I028
I029
I030
I027
I033
2830
1u
I056
I037
I036
2832
1u
I031
I035
2833
1u
I032
I034
I038
I039
SBUS Interface
S-DA-OUT
S-DA-IN
S-CL
S-ID
ADR.-SEL
DEMODULATOR
ANA_IN2+
ANA_IN1+
FM1
FM2
NICAM A
NICAM B
S1...4
I2SL/R
IDENT
DFP
SC3-IN-R
SCART 3
SC3-IN-L
MONO
MONO-IN
SC4-IN-R
SCART 4
SC4-IN-L
SC1-IN-R
SCART 1
SC1-IN-L
SC2-IN-R
SC2-IN-L
SCART 2
A/D
SCART-L
SCART-R
LOUDSPEAKER R
LOUDSPEAKER L
HEADPHONE R
HEADPHONE L
D/A
SCART Switching Facilities
I2S Interface
7801
MSP34
Variant
390R
3810
3811
I014
I059
I060
2810
100n
10u
GNDAP2
NC
+5TVBS
5804
100U
I040
5805
10u
I041
2836
10n
5A1
2837
2838
10n
2834
1p5
I042
1801
HC-49/U
18M432
I043
2835
1p5
20
15
17
16
6
1
4
5
13
14
11
12
54
39
9
10
59
60
58
47
46
55
44
43
53
52
50
49
27
35
41
45
48
51
56
2
3
8
19
30
61
64
57
62
63
21

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

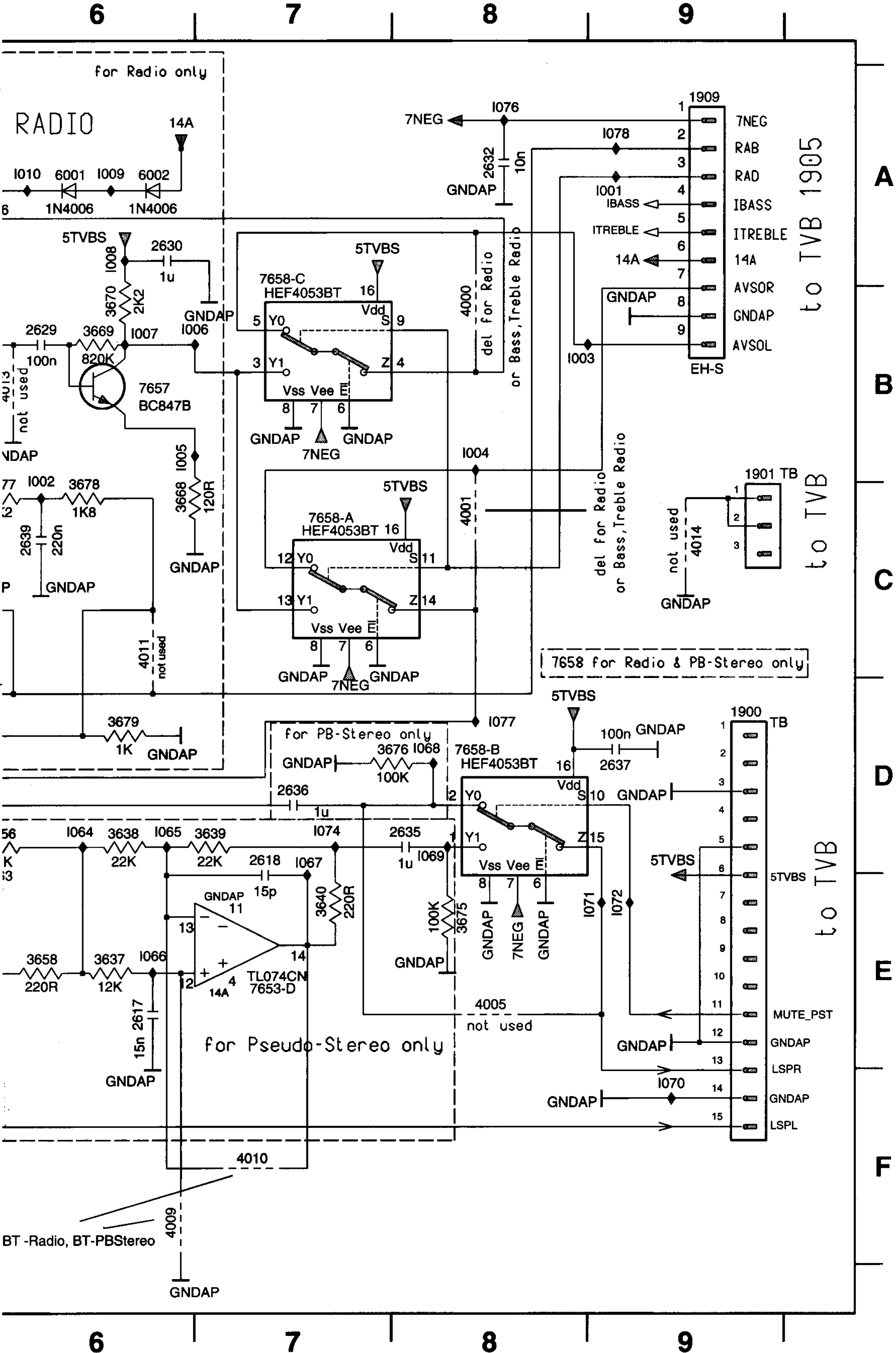

8
9
10
11
12
13
14
A
B
C
D
E
F
G
H
I
For DolbyPrologic
GNDAP2
2804
10u
2803
100n
4u7
2802
2800
1p5
2801
1p5
8TVB
I004
I003
1800
HC-49/U
18M432
I002
2805
10u
2806
10u
I001
I005
I006
2807
1n
2808
1n
7800
3800
100R
3801
100R
I007
I008
I010
I011
I012
I013
I009
43 36 51 52 34 32 49 48 47
VREFTOP
AGNDC
XTAL-IN
XTAL-OUT
CAPL-C1
CAPL-C2
NC
MONO-IN
SC1-IN-R
SC1-IN-L
SC2-IN-R
SC2-IN-L
SC3-IN-R
SC3-IN-L
STBYQ
ADR-SEL
IIC-CL
IIC-DA
IIS-WS
IIS-CL
IIS-DA-IN1
IIS-DA-IN2
IIS-DA-OUT1
IIS-DA-OUT2
DACC1-L
DACC1-R
DACC2-L
DACC2-R
SC1-OUT-L
SC1-OUT-R
SC2-OUT-L
SC2-OUT-R
D-CTR-IN
D-CTR-IO0
D-CTR-IO1
AUD-CL-OUT
TESTEN
DPL3519A FOR DOLBY PROLOGIC
DPL 3518A FOR VIRTUAL DOLBY
RESETQ
DVSUP
DVSS
AVSUP
AVSS
AHVSUP
AHVSS
VREF1
VREF2
20 16 17 46 45 33 35 29 23
I052
3809
10K
3808
10K
I053
2817
100n
2818
100n
I055
I054
2819
100n
For DolbyPrologic
2821
10u
5803
10u
5801
10u
2825
10u
5DS
8TVB
5A1
For VirtualDolby & DolbyPrologic
For VirtualDolby &
Dolby Prologic
5800
10u
2814
10n
3802
10K
I058
I057
2815
10u
2816
10n
2813
100n
2812
10u
I049
6801
BAS216
3805
47K
2822
10u
3812
10K
I050
I051
FOR DOLBY
410D
ISP3415
R STEREO
DACM-R
DACM-L
IDSPEAKER
2828
1n
2827
1n
4800
4801
FOR STEREO ONLY
NC
I044
2829
100n
2831
4u7
I045
I046
9802
9804
ACA-R
ADPHONE
ACA-L
SC1-OUT-R
SCART 1
SC1-OUT-L
SC2-OUT-R
SCART 2
SC2-OUT-L
2840
1n
2841
1n
For VirtualDolby &
Dolby Prologic
I047
9803
9805
2842
1n
2843
1n
not used
2844
1n
2845
1n
GNDAP2GNDAP2
ARCRO
ARCLO
to ACO
ADSO
ADCO
to ACO

1800	A13
1801	H7
1974	F1
1975	H1
2800	A13
2801	A13
2802	A12
2803	A12
2804	A12
2805	A13
2806	A13
2807	A14
2808	A14
2809	D8
2810	D8
2811	D8
2812	D8
2813	D8
2814	D9
2815	E9
2816	E9
2817	E13
2818	E12
2819	E13
2821	E12
2822	E10
2823	E3
2824	E3
2825	F13
2826	F4
2827	F10
2828	F9
2829	F9
2830	F4
2831	F9
2832	G4
2833	G4
2834	H7
2835	H7
2836	I6
2837	I7
2838	I7
2840	G9
2841	G9
2842	H9
2843	H9
2844	H8
2845	I8
3800	A11
3801	B11
3802	D9
3804	E3
3805	E10
3806	E3
3808	E11
3809	D12
3810	D7
3811	D7
3812	E9
4800	F10
4801	F11
5800	D9
5801	E14
5803	E12
5804	H5
5805	H6
6801	E9
7800	A12
7801	E8
9802	G10
9803	H10
9804	G10
9805	H10
F213	F2
F214	E2
F215	E2
I001	A13
I002	A13
I003	A13
I004	A13
I005	A12
I006	A12
I007	A11
I008	A11
I009	C12
I010	B9
I011	B9
I012	B9
I013	B9
I014	D8
I015	D2
I016	D2
I017	D2
I018	E2
I019	E2
I020	E2
I021	E2
I022	F2
I023	E3
I024	E4
I025	E4
I026	E3
I027	F3
I028	E4
I029	E4
I030	F4
I031	G4
I032	G4
I033	F2
I034	H3
I035	G2
I036	G2
I037	G2
I038	H2
I039	H2
I040	H6
I041	H7
I042	H7
I043	H7
I044	F9
I045	G9
I046	G9
I047	H9
I048	D8
I049	D8
I050	E9
I051	E9
I052	D11
I053	E12
I054	E12
I055	E13
I056	F4
I057	D9
I058	D9
I059	D7
I060	D7
I061	D2
I062	E2
I063	E2
I064	E2

Sound Feature Board (SFD)

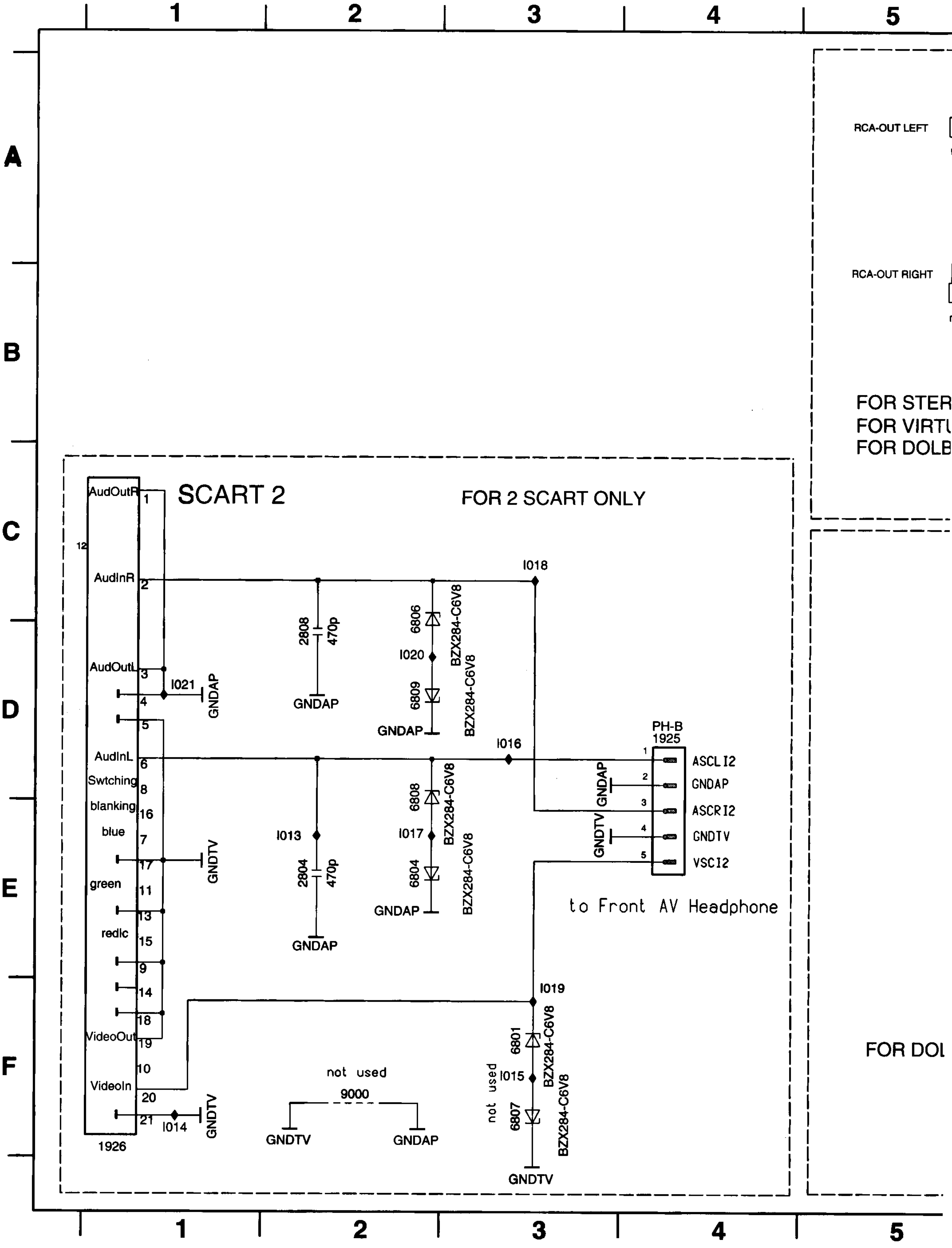

1
2
3
4
5
A
B
C
D
E
F
I026
2621
1u
I025
2640
1u
LEFT
GNDAP
RIGHT
VCC
PH-B
1903
3645
150K
3646
15K
14A
2634
10n
2622
1u
GNDAP
I036
I027
7653-B
TL074CN
I028
for Bass, Treble (BT) only
del for Bass,Treble
4004
I012
I011
I013
1N4
5TVBS
3665
4K7
3666
4K7
3667
33K
3644
4K7
3647
220R
14A
3642
6K8
2620
470p
3643
22K
2623
10p
I024
I033
I032
I031
I034
7611
BC847B
3648
68K
3652
150K
2624
6n8
I023
2625
22n
I022
I019
3673
6K8
7660
BC847B
I018
4012
3641
1K8
2619
1u
3650
47K
14A
3649
6K8
3651
68R
14A
3653
3K3
4003
not used
3672
15K
3674
8K2
GNDAP
I035
I029
I021
I015
I014
I017
3661
1K8
I030
7610
BC847B
7609
I020
BC847C
3654
1K
2631
1u
3671
15K
2638
220n
only for PBstereo and Bass,Treble
del for PBst. & BT
4006
3633
470K
7653-A
TL074CN
3634
15K
I037
2614
1u
I039
I038
5TVBS
4002
not used
7661
BC847B
3659
4K7
3632
220R
3629
22K
I046
2613
10p
I041
3625
68R
I073
14A
3635
3K3
I047
I040
3631
150K
2612
6n8
2610
22n
3630
68K
I045
3624
1K
I042
7606
BC847C
3628
6K8
2611
470p
3627
6K8
I048
I044
3626
47K
I061
3655
22K
I062
2627
15p
3657
12K
I049
7608
BC847B
7604
BC847B
I050
3623
4K7
14A
3618
1K8
2609
1u
3662
1K8
I043
3622
12K
7605
BC858B
3621
10K
2633
47u
I060
TL074C
7653-C
2628
15n
I059
I052
3616
33K
I051
7603
BC847B
7607
BC847B
I058
3620
33K
7655
BC847B
3617
33K
14A
I054
3663
1K
I053
TREBLE
7602
BC847B
I056
3619
33K
I057
3660
15K
4007
I055
3664
1K
BASS
I075
7656
BC847B
4008
Only for BT
for Bass, Treble (BT) only

Interconnections															
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

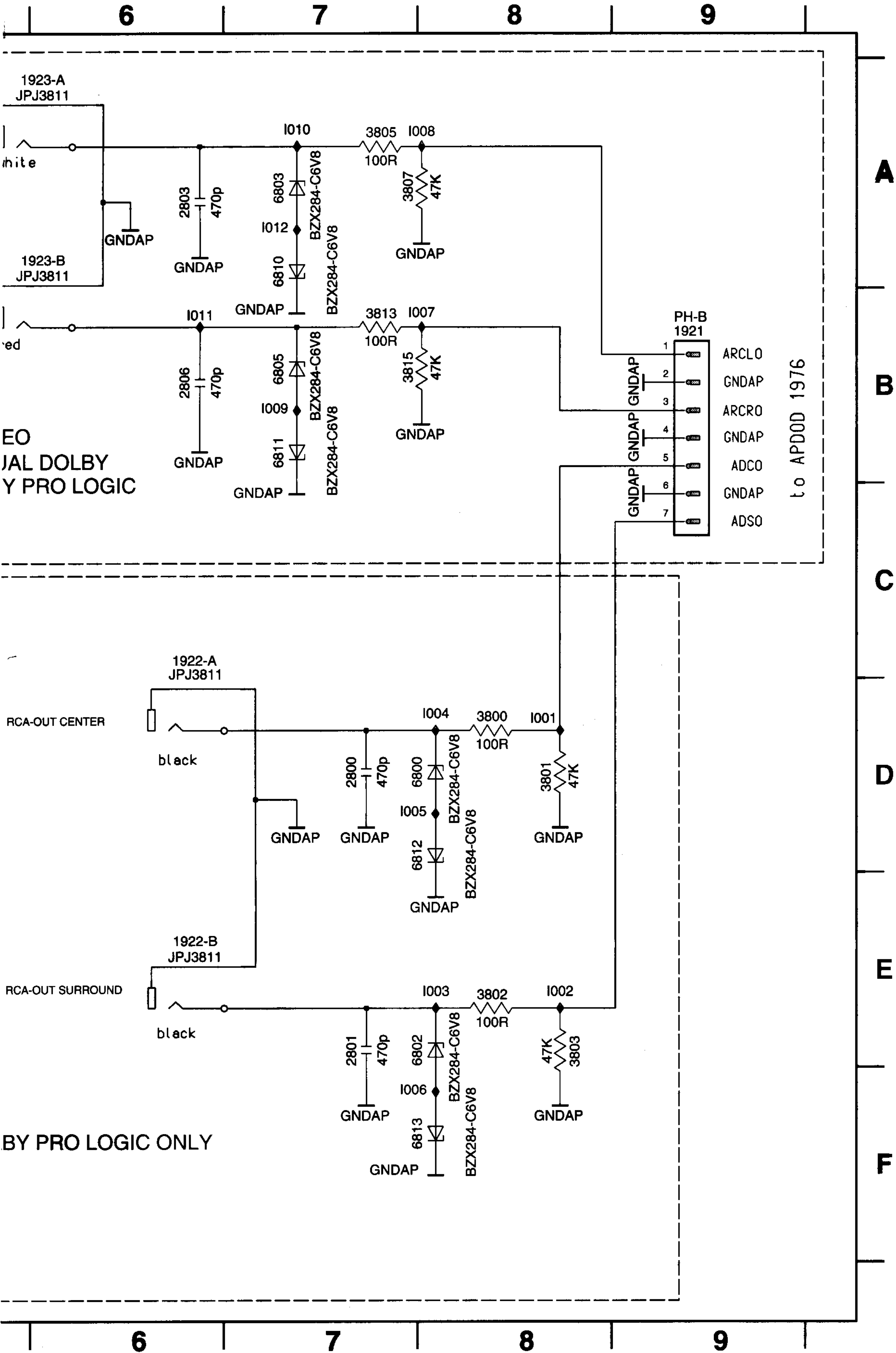

6
7
8
9
A
B
C
D
E
F
for Radio only
RADIO
14A
I010
6001
I009
6002
1N4006
1N4006
5TVBS
I008
2630
1u
3670
2K2
GNDAP
2629
100n
3669
820K
I007
I006
7657
BC847B
4013
not used
NDAP
I005
3668
120R
GNDAP
77
I002
3678
1K8
2639
220n
GNDAP
4011
not used
3679
1K
GNDAP
7658-C
HEF4053BT
5TVBS
16
Vdd
S
9
5
Y0
3
Y1
Z
4
Vss Vee E
8
7
6
GNDAP
7NEG
GNDAP
4000
del for Radio
or Bass,Treble Radio
7NEG
I076
2632
10n
GNDAP
I078
I001
IBASS
ITREBLE
14A
GNDAP
I003
1909
1
2
3
4
5
6
7
8
9
7NEG
RAB
RAD
IBASS
ITREBLE
14A
AVSOR
GNDAP
AVSOL
EH-S
to TVB 1905
I004
7658-A
HEF4053BT
5TVBS
16
Vdd
S
11
12
Y0
13
Y1
Z
14
Vss Vee E
8
7
6
GNDAP
7NEG
GNDAP
4001
del for Radio
or Bass,Treble Radio
1901 TB
1
2
3
not used
4014
GNDAP
to TVB
7658 for Radio & PB-Stereo only
5TVBS
I077
for PB-Stereo only
GNDAP
3676
100K
I068
7658-B
HEF4053BT
16
100n
GNDAP
2637
2636
1u
Vdd
S
10
GNDAP
2
Y0
1
Y1
Z
15
Vss Vee E
8
7
6
GNDAP
7NEG
GNDAP
56
K
I064
3638
22K
I065
3639
22K
I074
2635
1u
I069
2618
15p
I067
3640
220R
100K
3675
GNDAP
GNDAP
11
13
14
12
4
14A
TL074CN
7653-D
3658
220R
3637
12K
I066
2617
15n
GNDAP
I071
I072
4005
not used
for Pseudo-Stereo only
1900
TB
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
5TVBS
5TVBS
MUTE_PST
GNDAP
GNDAP
LSPR
I070
GNDAP
GNDAP
LSPL
to TVB
4010
4009
BT -Radio, BT-PBStereo
GNDAP

1900	D9	3662	E2	I021	C3
1901	B9	3663	F1	I022	B3
1903	A5	3664	F1	I023	B2
1909	A9	3665	A5	I024	B3
2609	E1	3666	A5	I025	A4
2610	D3	3667	B5	I026	A1
2611	D1	3668	C6	I027	A2
2612	D3	3669	B6	I028	A1
2613	D2	3670	B6	I029	B2
2614	C3	3671	C5	I030	C1
2617	E6	3672	B5	I031	B1
2618	D7	3673	B5	I032	B1
2619	B1	3674	B5	I033	B1
2620	B1	3675	E8	I034	B1
2621	A4	3676	D8	I035	B1
2622	A3	3677	C6	I036	A2
2623	B2	3678	C6	I037	C3
2624	B3	3679	D6	I038	C3
2625	B3	4000	B8	I039	C1
2627	E5	4001	C8	I040	D2
2628	E5	4002	C5	I041	D3
2629	B6	4003	B4	I042	D4
2630	A6	4004	A4	I043	E3
2631	C5	4005	E8	I044	D2
2632	A8	4006	C2	I045	D2
2633	E4	4007	F5	I046	D2
2634	A2	4008	F5	I047	D1
2635	D8	4009	F6	I048	D1
2636	D7	4010	F7	I049	E1
2637	D9	4011	C6	I050	E2
2638	C5	4012	B5	I051	E2
2639	C6	4013	B6	I052	E1
2640	A4	4014	C9	I053	F1
3616	E1	6000	A5	I054	F1
3617	F1	6001	A6	I055	F1
3618	E1	6002	A6	I056	F2
3619	F2	7602	F2	I057	F3
3620	F3	7603	E2	I058	F3
3621	E3	7604	E2	I059	E4
3622	E4	7605	E3	I060	E5
3623	E4	7606	D3	I061	D5
3624	D4	7607	E4	I062	D5
3625	D3	7608	E1	I063	E5
3626	D3	7609	C3	I064	D6
3627	D2	7610	C2	I065	D6
3628	D1	7611	B1	I066	E6
3629	D1	7653-A	C2	I067	D7
3630	D2	7653-B	A2	I068	D8
3631	D2	7653-C	E5	I069	D8
3632	D2	7653-D	E7	I070	F9
3633	C3	7655	F1	I071	E9
3634	C3	7656	F3	I072	E9
3635	D4	7657	B6	I073	D3
3637	E6	7658-A	C7	I074	D7
3638	D6	7658-B	D8	I075	F1
3639	D7	7658-C	A7	I076	A8
3640	E7	7660	B5	I077	D8
3641	B1	7661	D5	I078	A9
3642	B1	I001	A9		
3643	B1	I002	B6		
3644	B1	I003	B8		
3645	A1	I004	B8		
3646	A1	I005	B6		
3647	B3	I006	B6		
3648	B2	I007	B6		
3649	C1	I008	A6		
3650	B2	I009	A6		
3651	B3	I010	A6		
3652	B3	I011	A5		
3653	B4	I012	A5		
3654	C4	I013	A5		
3655	D5	I014	C5		
3656	D6	I015	B5		
3657	E5	I016	B5		
3658	E6	I017	C5		
3659	D1	I018	B5		
3660	F4	I019	B5		
3661	C1	I020	C4		

Cinch Out, Scart 2 Board (DOSCD)

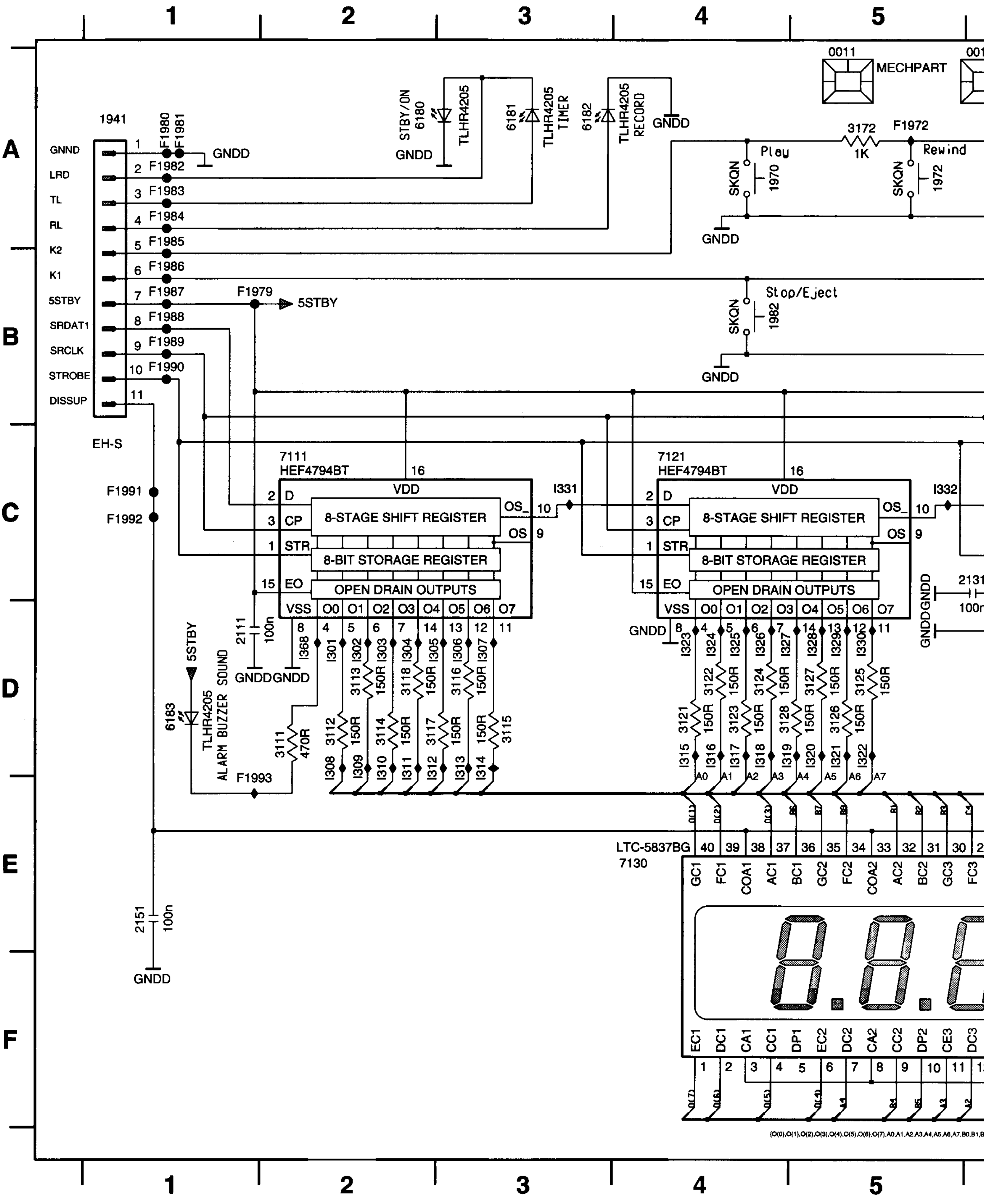

1
2
3
4
5
A
B
C
D
E
F
RCA-OUT LEFT
RCA-OUT RIGHT
FOR STER
FOR VIRTU
FOR DOLB
FOR DOL
SCART 2
FOR 2 SCART ONLY
AudOutR
AudInR
AudOutL
AudInL
Swtching
blanking
blue
green
redic
VideoOut
VideoIn
12
1926
I018
I020
I021
I016
I013
I017
I019
I015
I014
2808
470p
2804
470p
6806
6809
6808
6804
6801
6807
BZX284-C6V8
GNDAP
GNDTV
PH-B
1925
ASCLI2
GNDAP
ASCRI2
GNDTV
VSCI2
to Front AV Headphone
not used
9000
not used

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

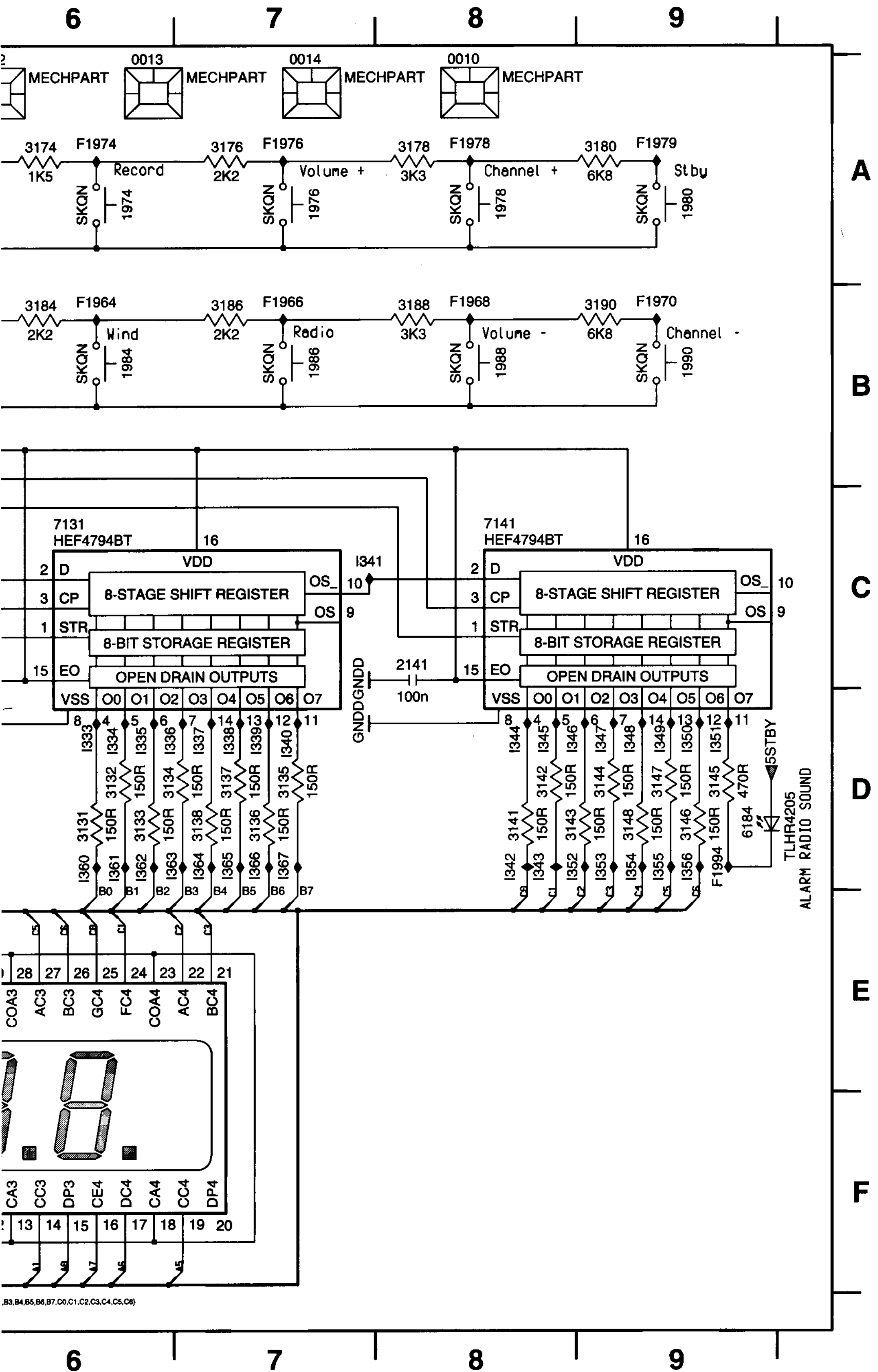

6
7
8
9
A
B
C
D
E
F
1923-A
JPJ3811
hite
1923-B
JPJ3811
GNDAP
2803
470p
I010
6803
I012
6810
BZX284-C6V8
3805
100R
I008
3807
47K
ed
I011
2806
6805
I009
6811
3813
I007
3815
PH-B
1921
1 ARCLO
2 GNDAP
3 ARCRO
4 GNDAP
5 ADCO
6 GNDAP
7 ADSO
to APDOD 1976
EO
JAL DOLBY
Y PRO LOGIC
1922-A
JPJ3811
RCA-OUT CENTER
black
2800
I004
6800
I005
6812
3800
I001
3801
1922-B
JPJ3811
RCA-OUT SURROUND
2801
I003
6802
I006
6813
3802
I002
3803
BY PRO LOGIC ONLY

1921	B9
1922-A	C6
1922-B	E6
1923-A	A6
1923-B	A6
1925	D4
1926	F1
2800	D7
2801	E7
2803	A6
2804	E2
2806	B6
2808	D2
3800	D8
3801	D8
3802	E8
3803	E8
3805	A7
3807	A7
3813	B7
3815	B7
6800	D8
6801	F3
6802	E8
6803	A7
6804	E2
6805	B7
6806	C2
6807	F3
6808	D2
6809	D2
6810	A7
6811	B7
6812	D8
6813	F8
9000	F2
I001	D8
I002	E8
I003	E8
I004	D8
I005	D7
I006	F7
I007	B8
I008	A8
I009	B7
I010	A7
I011	B6
I012	A7
I013	E2
I014	F1
I015	F3
I016	D3
I017	E2
I018	C3
I019	F3
I020	D2
I021	D1

Keys & Display Board (KB1D)

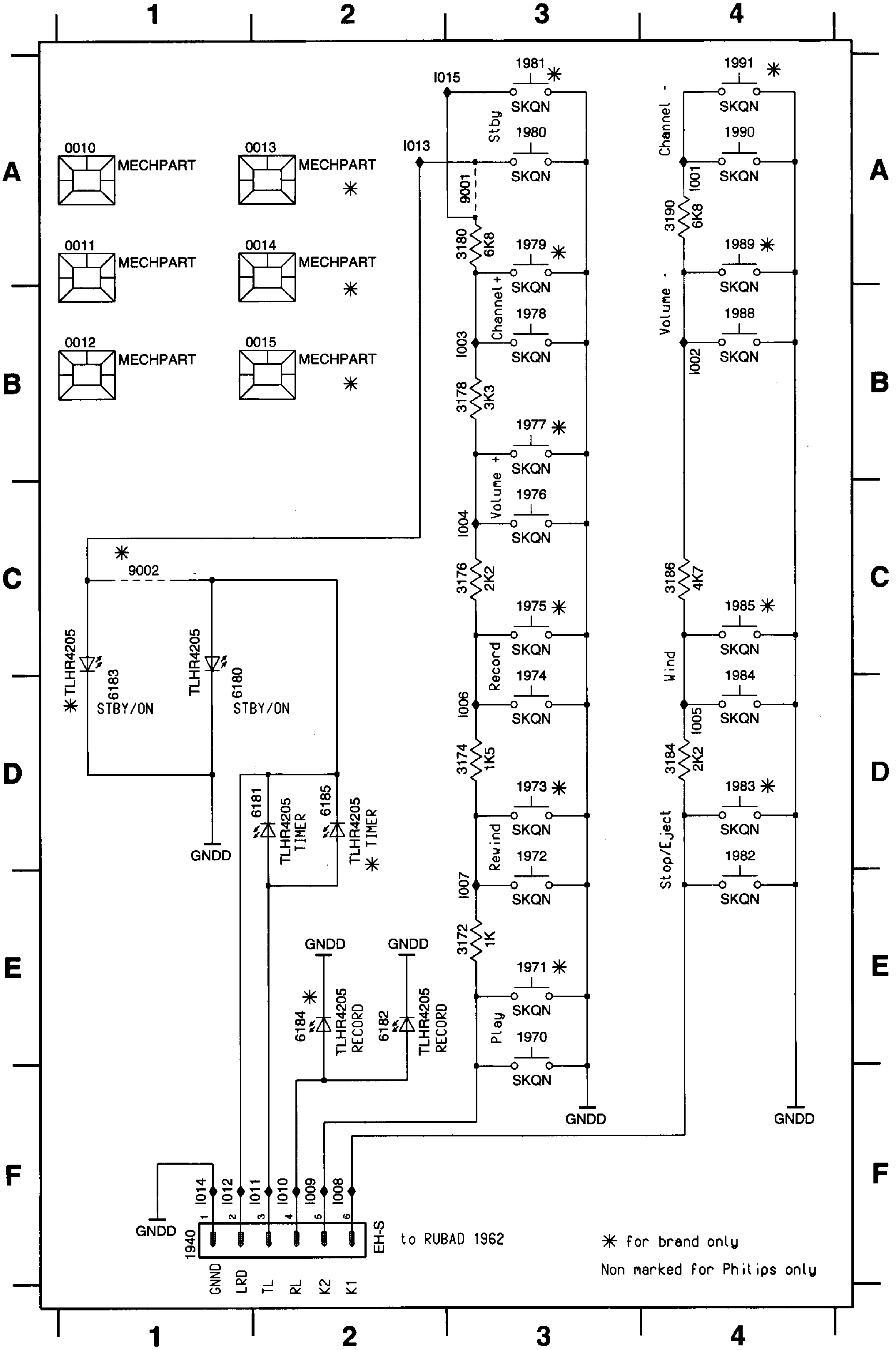

1
2
3
4
5
A
B
C
D
E
F
1941
GNND
LRD
TL
RL
K2
K1
5STBY
SRDAT1
SRCLK
STROBE
DISSUP
EH-S
F1980
F1981
F1982
F1983
F1984
F1985
F1986
F1987
F1988
F1989
F1990
F1979
5STBY
GNDD
STBY/ON
6180
TLHR4205
6181
TLHR4205
TIMER
6182
TLHR4205
RECORD
0011
MECHPART
3172
1K
F1972
Play
SKQN
1970
Rewind
SKQN
1972
Stop/Eject
SKQN
1982
7111
HEF4794BT
7121
HEF4794BT
VDD
16
D
CP
STR
EO
VSS
8-STAGE SHIFT REGISTER
8-BIT STORAGE REGISTER
OPEN DRAIN OUTPUTS
OS_
OS
O0
O1
O2
O3
O4
O5
O6
O7
I331
I332
2111
100n
2131
100n
F1991
F1992
6183
TLHR4205
ALARM BUZZER SOUND
F1993
3111
470R
3112
3113
3114
3115
3116
3117
3118
3121
3122
3123
3124
3125
3126
3127
3128
150R
I301
I302
I303
I304
I305
I306
I307
I308
I309
I310
I311
I312
I313
I314
I315
I316
I317
I318
I319
I320
I321
I322
I323
I324
I325
I326
I327
I328
I329
I330
I368
A0
A1
A2
A3
A4
A5
A6
A7
LTC-5837BG
7130
GC1
FC1
COA1
AC1
BC1
GC2
FC2
COA2
AC2
BC2
GC3
FC3
EC1
DC1
CA1
CC1
DP1
EC2
DC2
CA2
CC2
DP2
CE3
DC3
2151
100n
GNDD
(O(0),O(1),O(2),O(3),O(4),O(5),O(6),O(7),A0,A1,A2,A3,A4,A5,A6,A7,B0,B1,B

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	


6
7
8
9
A
B
C
D
E
F
0013
0014
0010
MECHPART
3174
1K5
F1974
Record
SKQN
1974
3176
2K2
F1976
Volume +
1976
3178
3K3
F1978
Channel +
1978
3180
6K8
F1979
Stby
1980
3184
2K2
F1964
Wind
1984
3186
2K2
F1966
Radio
1986
3188
3K3
F1968
Volume -
1988
3190
6K8
F1970
Channel -
1990
7131
HEF4794BT
7141
HEF4794BT
16
VDD
D
CP
STR
EO
VSS
8-STAGE SHIFT REGISTER
8-BIT STORAGE REGISTER
OPEN DRAIN OUTPUTS
OS_
OS
O0 O1 O2 O3 O4 O5 O6 O7
I341
2141
100n
GNDDGNDD
3131 3132 3133 3134 3138 3137 3136 3135
150R
3141 3142 3143 3144 3148 3147 3146 3145
470R
6184
5STBY
TLHR4205
ALARM RADIO SOUND
F1994
B0 B1 B2 B3 B4 B5 B6 B7
28 27 26 25 24 23 22 21
COA3 AC3 BC3 GC4 FC4 COA4 AC4 BC4
CA3 CC3 DP3 CE4 DC4 CA4 CC4 DP4
13 14 15 16 17 18 19 20
,B3,B4,B5,B6,B7,C0,C1,C2,C3,C4,C5,C6)

0010	A8	F1972	A5	I356	D9
0011	A5	F1974	A6	I360	D6
0012	A6	F1976	A7	I361	D6
0013	A6	F1978	A8	I362	D6
0014	A7	F1979	B1	I363	D6
1941	A1	F1979	A9	I364	D7
1970	A4	F1980	A1	I365	D7
1972	A5	F1981	A1	I366	D7
1974	A6	F1982	A1	I367	D7
1976	A7	F1983	A1	I368	D2
1978	A8	F1984	A1		
1980	A9	F1985	A1		
1982	B4	F1986	B1		
1984	B6	F1987	B1		
1986	B7	F1988	B1		
1988	B8	F1989	B1		
1990	B9	F1990	B1		
2111	D1	F1991	C1		
2131	C6	F1992	C1		
2141	C8	F1993	E1		
2151	E1	F1994	D9		
3111	D2	I301	D2		
3112	D2	I302	D2		
3113	D2	I303	D2		
3114	D2	I304	D2		
3115	D3	I305	D2		
3116	D3	I306	D3		
3117	D2	I307	D3		
3118	D2	I308	D2		
3121	D4	I309	D2		
3122	D4	I310	D2		
3123	D4	I311	D2		
3124	D4	I312	D2		
3125	D5	I313	D3		
3126	D5	I314	D3		
3127	D5	I315	D4		
3128	D4	I316	D4		
3131	D6	I317	D4		
3132	D6	I318	D4		
3133	D6	I319	D4		
3134	D6	I320	D5		
3135	D7	I321	D5		
3136	D7	I322	D5		
3137	D7	I323	D4		
3138	D7	I324	D4		
3141	D8	I325	D4		
3142	D8	I326	D4		
3143	D8	I327	D4		
3144	D9	I328	D5		
3145	D9	I329	D5		
3146	D9	I330	D5		
3147	D9	I331	C3		
3148	D9	I332	C5		
3172	A5	I333	D6		
3174	A6	I334	D6		
3176	A7	I335	D6		
3178	A8	I336	D6		
3180	A9	I337	D7		
3184	B6	I338	D7		
3186	B7	I339	D7		
3188	B8	I340	D7		
3190	B9	I341	C7		
6180	A2	I342	D8		
6181	A3	I343	D8		
6182	A3	I344	D8		
6183	D1	I345	D8		
6184	D9	I346	D8		
7111	C2	I347	D9		
7121	C4	I348	D9		
7130	E4	I349	D9		
7131	C6	I350	D9		
7141	C8	I351	D9		
F1964	B6	I352	D8		
F1966	B7	I353	D9		
F1968	B8	I354	D9		
F1970	B9	I355	D9		

Key Board (KB2D)

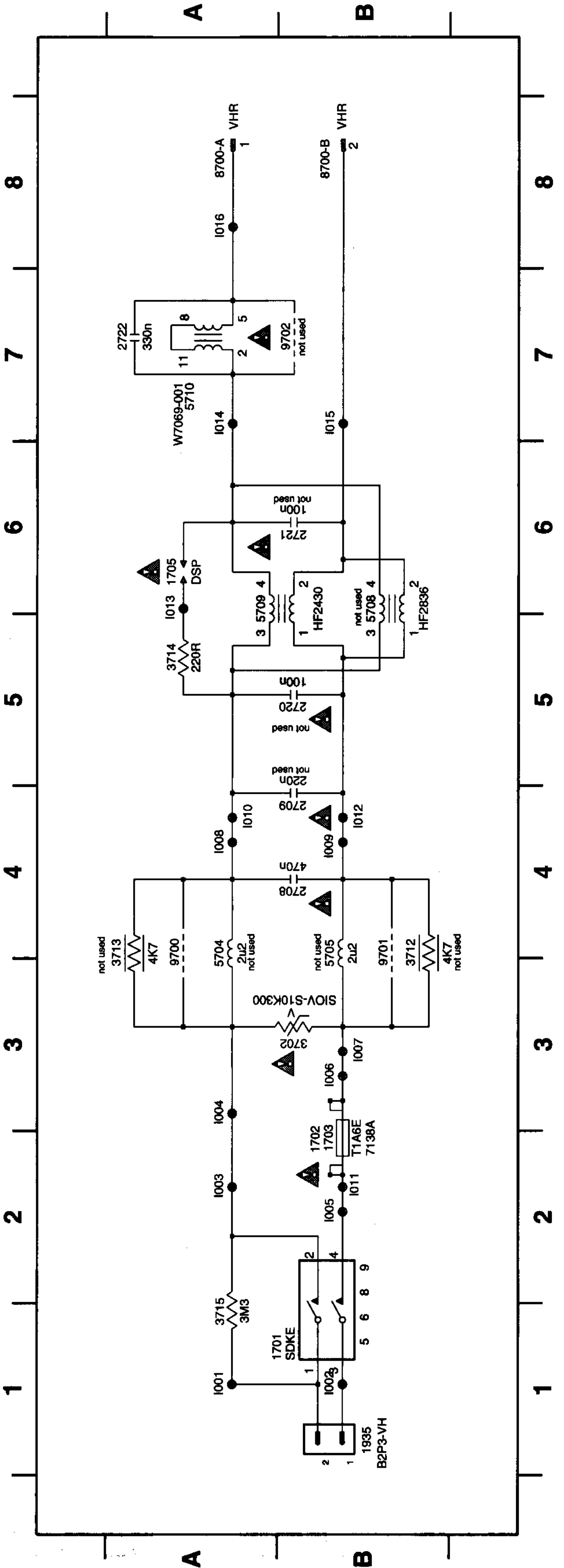

1
2
3
4
A
B
C
D
E
F
0010 MECHPART
0011 MECHPART
0012 MECHPART
0013 MECHPART
0014 MECHPART
0015 MECHPART
I015
I013
9001
1981 SKQN
1980 SKQN
Stby
3180 6K8
1979 SKQN
Channel +
1978 SKQN
I003
3178 3K3
1977 SKQN
Volume +
1976 SKQN
I004
3176 2K2
1975 SKQN
Record
1974 SKQN
I006
3174 1K5
1973 SKQN
Rewind
1972 SKQN
I007
3172 1K
1971 SKQN
Play
1970 SKQN
GNDD
1991 SKQN
Channel -
1990 SKQN
I001
3190 6K8
1989 SKQN
Volume -
1988 SKQN
I002
3186 4K7
1985 SKQN
Wind
1984 SKQN
I005
3184 2K2
1983 SKQN
Stop/Eject
1982 SKQN
GNDD
9002
TLHR4205 6183 STBY/ON
TLHR4205 6180 STBY/ON
GNDD
6181 TLHR4205 TIMER
6185 TLHR4205 TIMER
GNDD
GNDD
6184 TLHR4205 RECORD
6182 TLHR4205 RECORD
I014
I012
I011
I010
I009
I008
1 2 3 4 5 6
GNDD
1940
EH-S
GNND LRD TL RL K2 K1
to RUBAD 1962
✳ for brand only
Non marked for Philips only

0010	A1
0011	A1
0012	B1
0013	A1
0014	A1
0015	B1
1940	F1
1970	E3
1971	E3
1972	D3
1973	D3
1974	D3
1975	C3
1976	C3
1977	B3
1978	B3
1979	A3
1980	A3
1981	A3
1982	D4
1983	D4
1984	D4
1985	C4
1988	B4
1989	A4
1990	A4
1991	A4
3172	E3
3174	D3
3176	C3
3178	B3
3180	A3
3184	D4
3186	C4
3190	A4
6180	D1
6181	D2
6182	E2
6183	D1
6184	E2
6185	D2
9001	A3
9002	C1
I001	A4
I002	B4
I003	B3
I004	C3
I005	D4
I006	D3
I007	E3
I008	F2
I009	F2
I010	F2
I011	F2
I012	F1
I013	A2
I014	F1
I015	A3

	Interconnections														
Circuit	ACO	AF	AF2	AIO1	AIO2	AL	AMP	AP	COTV	CVB	DE	DOSCD	HA	HPAV	IO_1
page	3-29	3-22	3-30	3-16	3-17	3-23	3-13	3-21	3-14	3-19	3-18	3-32	3-26	3-27	3-11
Circuit	KB1D	KB2D	LS	MFSWD	PS (RUB)	PS (TVB)	PT	SF	SFD	TU1	TU2	TV	VS	VSEC	
page	3-33	3-34	3-8	3-34	3-15	3-7	3-28	3-12	3-31	3-9	3-20	3-10	3-24	3-25	

Mainsfilter Board (MFSWD)

1701	B1
1702	B2
1703	B2
1705	A6
1935	B1
2708	B4
2709	B4
2720	B5
2721	B6
2722	A7
3702	B3
3712	B4
3713	A4
3714	A5
3715	A1
5704	A4
5705	B4
5708	B6
5709	A6
5710	A7
8700-A	A8
8700-B	B8
9700	A4
9701	B4
9702	B7
I001	A1
I002	B1
I003	A2
I004	A3
I005	B2
I006	B3
I007	B3
I008	A4
I009	B4
I010	A4
I011	B2
I012	B4
I013	A6
I014	A7
I015	B7
I016	A8


A
B
1
2
3
4
5
6
7
8
1935
B2P3-VH
1701
SDKE
I001
I002
3715
3M3
I003
I004
I005
I011
1702
1703
T1A6E
7138A
I006
I007
3702
SIOV-S10K300
3713
4K7
not used
9700
5704
2u2
not used
5705
2u2
not used
9701
3712
4K7
not used
2708
470n
I008
I009
I010
I012
2709
220n
not used
2720
100n
not used
3714
220R
I013
1705
DSP
5709
HF2430
5708
HF2836
not used
2721
100n
not used
I014
I015
W7069-001
5710
2722
330n
9702
not used
I016
8700-A
8700-B
VHR
1
2

Variant List Tuner 1 - TV Board (TVBAD)

	PAL BG	PAL I	PAL,SEC DK,K1	PALBG/I (1 Tuner sets only)	PAL, SEC, BG/DK	PAL, BG/I, SEC L/L'	PAL, SEC BG/I/DK, SEC L/L'
Pos.	FM- Mono	FM- Mono	FM-Mono	FM-Mono	FM-Mono	FM-, AM-Mono	FM, AM, NICAM, Stereo
1700	UV 1316T / AI	UV 1316T / AI	UV 1316T / AI	---	UV 1316T / AI	UV 1316T / AI	UV 1316T / AI
1701	UV 1316	UV 1316	UV 1316	UV 1316	UV 1316	UV 1316	UV 1316
1702	EFC 5,5	EFC 6,0	EFC 6,5	EFC 5,5	EFC 5,5	EFC 5,5	---
1703	---	---	---	EFC 6,0	EFC 6,5	EFC 6,0	---
1704	TPS 5,5	TPS 6,0	TPS 6,5	TPS 5,5	TPS 5,5	Double TPS 5,5/6,0	TPS 5,5
1705	---	---	---	TPS 6,0	TPS 6,5	---	---
1707	G1961M	J1980M	K2955M	G1965M	G1961M	---	---
1708	---	---	---	---	K2955M	G1965M	K3953M
1709	---	---	---	---	---	---	G3956M
1710	---	---	---	---	---	---	K9456M
1711	---	---	---	---	---	K9456M	---
2701	---	---	---	---	---	220p	120p
2708	---	---	---	---	---	47p	47p
2719	3n3	3n3	3n3	3n3	3n3	3n3	---
2720	---	---	---	---	---	2µ2	2µ2
2721	---	---	---	---	---	120p	220p
2722	22µ	22µ	22µ	22µ	22µ	22µ	---
2723	0,47µ	0,47µ	0,47µ	0,47µ	0,47µ	---	---
2740	47µ	47µ	47µ	47µ	47µ	47µ	---
2725	---	---	---	---	---	470n	470n
3702	---	---	---	270R	180R	1R	1R
3703	---	---	---	---	4k7	---	---
3704	---	---	---	1k2	1k2	1k2	---
3705	470R	470R	470R	470R	470R	470R	---
3706	---	---	---	470R	470R	470R	---
3707	560R	560R	560R	1k2	1k2	1k2	560R
3710	---	---	---	---	4k7	---	---
3711	560R	560R	560R	560R	560R	560R	820R
3713	---	---	---	1k	1k5	0R	0R
3714	330R	270R	270R	270R	270R	180R	---
3716	---	---	---	1k5	1k5	1k5	1k5
3717	1k5	1k5	1k5	1k5	1k5	1k5	---
3719	---	---	---	---	---	1k5	1k5
3724	---	---	---	4k7	4k7	4k7	4k7
3725	1k5	1k0	1k5	1k5	1k5	1k5	1R
3727	---	---	---	---	---	---	330R
3728	---	---	---	---	---	---	4k7
3729	---	---	---	---	---	---	4k7
3733	---	---	---	---	---	100R	100R
3740	---	---	---	---	---	4k7	---
3741	---	---	---	---	---	4k7	---
3742	390k	390k	390k	390k	390k	390k	---
3743	1k	1k	1k	1k	1k	1k	---
3744	680R	680R	680R	680R	680R	680R	---
3745	470R	470R	470R	470R	470R	470R	---
4700	0R	0R	0R	---	---	---	---
4701	0R	0R	0R	---	---	---	---
4702	---	---	---	---	0R	---	---
4704	---	---	---	---	---	0R	0R
4707	0R	0R	0R	0R	---	---	0R
4711	---	---	---	---	0R	---	---
4730	---	---	---	---	---	---	not used
5700	1µH	1µH	1µH	1µH	1µH	---	---
5701	---	---	---	---	---	41645	41645
5702	---	---	---	---	---	---	---
5704	15µH	15µH	15µH	15µH	15µH	10µH	---
5712	---	---	---	15µH	15µH	---	---
6700	---	---	---	---	BA792	---	---
6701	---	---	---	---	---	---	BA792
6702	---	---	---	---	---	---	BA792
6705	---	---	---	---	BA792	---	---
6706	---	---	---	---	---	BA792	---
6707	---	---	---	---	---	BA792	---
7205	*TDA 8840/41	*TDA 8840/41	TDA 8842	*TDA 8840/41	TDA 8842	TDA 8842	*TDA 8842 / TDA 8844
7701	---	---	---	HEF 4053	HEF 4053	HEF 4053	HEF 4053
7705	---	---	---	---	---	TDA9830	---
7709	---	---	---	---	PDCT124ET	---	---
7710	---	---	---	---	PDCT124ET	---	---
7711	BC 847B	BC 847B	BC 847B	BC 847B	BC 847B	BC 847B	---
7713	---	---	---	---	---	---	PDCT124ET
7714	---	---	---	---	---	---	PDCT124ET
7715	---	---	---	---	---	PDCT124ET	---
7716	---	---	---	---	---	PDCT124ET	---
7720	---	---	---	---	---	---	TDA 9818T
9701	0R	0R	0R	0R	0R	0R	---
9705	---	---	---	---	---	---	0R
9706	---	---	---	---	---	---	0R
Demodulator for:							
Video	IC 7205	IC 7205	IC 7205	IC 7205	IC 7205	IC 7205	IC 7205
Video (PAL BG)	IC 7205	---	---	IC 7205	IC 7205	IC 7205	IC 7720
Audio (FM-mono)	IC 7205	IC 7205	IC 7205	IC 7205	IC 7205	IC 7205	---
Audio (FM-stereo)	---	---	---	---	---	---	IC 7801 (APDOD)
NICAM	---	---	---	---	---	---	IC 7801 (APDOD)
Audio AM	---	---	---	---	---	IC 7705	IC 7720

TDA 9818T: + 2728, 2729, 2730, 2731, 2732, 2733, 2734, 2735, 3735, 3736, 3737, 3738, 5707, 5708, 7712, 9702.
TDA 9830 : + 2714, 2716, 2717.

*TDA 8844 for tubes with 25'
*TDA 8841 for non-standard NTSC-Pb

Variant List Tuner 2 - Recorder Unit Board (RUBAD)

	PAL BG	PAL I	PAL,SEC DK,K1	PAL, SEC, BG/DK	PAL, BG/I, SEC L/L'	PAL, SEC BG/I/DK, SEC L/L'
Pos.	FM-Mono	FM- Mono	FM-Mono	FM-Mono	FM-, AM-Mono	FM, AM, NICAM Stereo
1300	---	---	---	---	K3953M	K3953M
1301	UV 1316	UV 1316	UV 1316	UV 1316	UV 1316	UV 1316
1302	G1961M	J1980M	K2955M	G3956M	---	G3956M
1305	---	---	---	K9463M	K9456M	K9456M
1304	TPS 5,5	TPS 6,0	TPS 6,5	TPS 5,5	TPS 5,5	TPS 5,5
1306	EFC 5,5	EFC 6,0	EFC 6,5	EFC 5,5	EFC 5,5	---
1307	---	---	---	EFC 6,5	EFC 6,0	---
2311	---	---	---	---	100n	100n
2316	---	---	---	---	220p	220p
2317	---	---	---	---	120p	120p
2322	22n	22n	22n	22n	22n	---
2323	22µ	22µ	22µ	22µ	22µ	---
3310	470R	470R	470R	470R	470R	---
3312	---	---	---	470R	470R	---
3302	---	---	---	---	5k6	5k6
3306	---	---	---	---	---	4k7
3308	---	---	---	---	100R	100R
3311	---	---	---	3k3	3k3	3k3
3313	---	---	---	220R	220R	220R
3314	330R	270R	270R	270R	270R	270R
3316	---	---	---	---	---	4k7
3321	---	---	---	4k7	4k7	4k7
3322	---	---	---	4k7	4k7	4k7
3323	2k7	2k7	2k7	2k7	2k7	---
3325	---	---	---	4k7	4k7	4k7
4301	---	---	---	---	---	---
4302	---	---	---	---	0R	---
4303	0R	0R	0R	0R	---	---
4304	---	---	---	---	---	0R
4305	0R	0R	0R	---	---	---
4306	0R	0R	0R	---	---	---
4307	0R	0R	0R	---	---	---
5301	---	---	---	---	41645	41645
5306	---	---	---	---	---	---
5307	---	---	---	---	---	---
6300	---	---	---	---	---	BA792
6301	---	---	---	---	---	BA792
6303	---	---	---	BA792	BA792	BA792
6304	---	---	---	BA792	BA792	BA792
7300	---	---	---	---	PDCT124ET	PDCT124ET
7301	---	---	---	HEF4053	HEF4053	HEF4053
7302	---	---	---	---	---	PDCT124ET
7304	---	---	---	---	---	PDCT124ET
7307	---	---	---	PDCT124ET	PDCT124ET	PDCT124ET
7308	---	---	---	PDCT124ET	PDCT124ET	PDCT124ET
7309	TDA 9817 T	TDA 9817 T	TDA 9817 T	TDA 9817 T	TDA 9818 T	TDA 9818 T
Demodulator for:						
Video	IC 7309	IC 7309	IC 7309	IC 7309	IC 7309	IC 7309
Audio (FM-mono)	IC 7309	IC 7309	IC 7309	IC 7309	IC 7309	---
Audio (FM-stereo)	---	---	---	---	---	IC 7670 (AP)
NICAM	---	---	---	---	---	IC 7670 (AP)
Audio AM	IC 7309	IC 7309	IC 7309	IC 7309	IC 7309	IC 7309

Component Mapping TV Board (TVBAD)

Components side

0205	C10
0300	D3
0310	E7
0450	E10
0500	C3
0510	A7
0800	G9
0970	B10
1001	F3
1002	F1
1010	G3
1200	C10
1201	C10
1300	G5
1301	G4
1302	G3
1303	D7
1304	G6
1391	F6
1700	B9
1701	A8
1702	D9
1703	D8
1704	E8
1705	E9
1707	C9
1708	C8
1709	C7
1710	C8
1711	D8
1905	G10
1931	F3
1932	G5
1933	E3
1934	G1
1950	B6
1955	B1
1958	B1
1961	C2
1962	F8
1963	F9
1964	B10
1966	D7
1969	B10
1970	A10
1978	A10
1992	E2
1993	E2
1995	D2
1996	D1
1997	D1
1998	F1
1999	D2
2175	C1
2176	C1
2186	A1
2202	D9
2212	C9
2216	E10
2217	E10
2227	D8
2228	C9
2233	C9
2301	F4
2302	G4
2303	G4
2304	F4
2305	F3
2306	F5
2307	G4
2308	F5
2309	E4
2310	E4
2311	E4
2312	F4
2313	E4
2314	D6
2315	D3
2316	E4
2317	D4
2323	F4
2339	F5
2340	F5
2341	F6
2344	F6
2350	D6
2351	F6
2352	E6
2353	D6
2354	D6
2356	E7
2359	D6
2360	E6
2370	E6
2371	E6
2372	G8
2374	D10
2380	E7
2383	F6
2385	G6
2391	F6
2393	E7
2407	E2
2408	E2
2451	F10
2452	E10
2455	F10
2459	G7
2460	F10
2461	F9
2501	A4
2502	A4
2503	A4
2510	C6
2514	C6
2517	C6
2518	C4
2519	C4
2520	C4
2522	C4
2523	D4
2524	C5
2525	C3
2526	D3
2527	C3
2528	A5
2530	C5
2531	C5
2535	B6
2537	A6
2539	A6
2544	B7
2545	A7
2548	A6
2563	A5
2702	A9
2704	B8
2709	D9
2713	D8
2714	E8
2717	E8
2720	C8
2722	C8
2723	C9
2727	B7
2728	C7
2730	C7
2734	D7
2740	D10
2900	A9
2905	B9
2906	B10
2915	B10
3177	B2
3179	C2
3181	C1
3182	C2
3186	B1
3187	C1
3193	C2
3196	C2
3197	C1
3198	C2
3199	C1
3206	C10
3207	C9
3225	E10
3235	C9
3236	C8
3253	D10
3301	G4
3302	G4
3303	G5
3304	F5
3305	F4
3306	F4
3307	D5
3308	D5
3311	E4
3312	E4
3313	E4
3314	G4
3315	G4
3316	E3
3320	D3
3322	E5
3326	E4
3327	D4
3328	D4
3334	G1
3335	E3
3339	F7
3348	G6
3350	D6
3360	E7
3361	D7
3370	G7
3380	F7
3391	E7
3402	E1
3403	E1
3418	E1
3419	E1
3450	G9
3451	F9
3452	E10
3457	F9
3459	G7
3464	G6
3468	F10
3469	F10
3473	F8
3474	F7
3502	A3
3503	B3
3504	A3
3505	A4
3509	C6
3512	B6
3515	C7
3516	C7
3520	C4
3521	A4
3522	C5
3523	C4
3524	A3
3525	B3
3527	C4
3529	A7
3530	B6
3531	B6
3532	B6
3534	B6
3535	B6
3537	B6
3538	B6
3539	B6
3545	A7
3561	A6
3562	A6
3563	A6
3564	A6
3565	A6
3566	A5
3568	B7
3569	B7
3700	A7
3701	B7
3719	E9
3726	D9
3727	E8
3807	G8
3810	G8
3814	F9
3816	G8
3818	F8
3821	G8
3827	G8
3828	F8
3831	G8
3832	G8
3834	G8
3835	G8
3837	G8
3839	F8
3841	G9
3844	G9
3847	C10
3860	F8
3861	F8
3864	G9
3906	A9
3909	A9
3947	B9
5190	A2
5301	F4
5302	F3
5303	E3
5304	G4
5305	G4
5310	E4
5312	D4
5313	D4
5330	F5
5340	F6
5341	G6
5350	D6
5351	D6
5360	D6
5370	E7
5380	F6
5500	A4
5501	A4
5502	C6
5518	C7
5519	A5
5520	A5
5522	C5
5525	D3
5526	B3
5700	B8
5701	B8
5703	B7
5704	E8
5705	B8
5706	D9
5707	C7
5708	C7
5712	E9
6175	C1
6176	C2
6178	C1
6180	C2
6190	B2
6191	B2
6201	D10
6202	D10
6221	E9
6234	E10
6235	E10
6236	E10
6301	F4
6302	F4
6303	F4
6304	F4
6314	E4
6322	F4
6325	D3
6326	D3
6340	F6
6341	G5
6342	E6
6350	D6
6351	D6
6355	D6
6356	E7
6358	F6
6370	E6
6372	G7
6373	G8
6376	F8
6377	F9
6378	F9
6380	E6
6381	F6
6382	F7
6385	G6
6390	F6
6391	F6
6392	E7
6393	E7
6402	E2
6403	E1
6404	E2
6405	E2
6406	E1
6407	E1
6452	G7
6453	G7
6454	F7
6455	F8
6456	G6
6520	C5
6521	C4
6522	D4
6523	C5
6524	D4
6526	B4
6528	A5
6532	A6
6537	B6
6538	B7
6540	B6
6541	A7
6542	B7
6543	B7
6544	B7
6545	A7
6547	A7
6549	B7
6550	A6
6568	B7
6900	A9
6901	A9
6902	B9
6903	A10
6904	B10
6905	B9
6906	B10
6907	B10
6908	B9
6909	B10
6910	A10
6911	A10
6912	B10
6913	B10
7180	C2
7181	C1
7182	D2
7183	C2
7184	C1
7185	C2
7186	D2
7187	D1
7188	D2
7205	D9
7300	D3
7310	E3
7340	F5
7341	G6
7355	D6
7370	G7
7375	E10
7381	G6
7391	E7
7392	E7
7450	F10
7501	A4
7510	C6
7520	C3
7521	C4
7555	A6
7556	A6
7705	D8
7804	F9
7806	C10
8013	B10
8025	G10
8025	D2
8026	E1
8026	F10
8027	B2
8027	B7
8028	C1
8028	E9
9176	B2
9190	A2
9193	B2
9194	B2
9196	C2
9197	C1
9198	C2
9221	D9
9222	B10
9226	D10
9227	E10
9228	E10
9229	C10
9230	C10
9231	C10
9232	D9
9233	E10
9234	E10
9235	E10
9236	E10
9237	E9
9238	E10
9239	E10
9244	E10
9245	E9
9247	E8
9248	E8
9249	F9
9250	F9
9251	F9
9252	F9
9256	C9
9302	F4
9303	F3
9304	E4
9305	F5
9306	F6
9307	F6
9308	F7
9309	F4
9312	E4
9313	E4
9314	G4
9315	G4
9316	E4
9317	E3
9319	D4
9320	E5
9321	F7
9322	F7
9323	F7
9324	F7
9325	E6
9326	E6
9327	E6
9328	E7
9329	E7
9330	E7
9331	E7
9333	E7
9334	E6
9335	D7
9336	C7
9361	D7
9362	E6
9363	D7
9390	G8
9391	G8
9392	D5
9393	D5
9421	E2
9422	D1
9451	F10
9452	G6
9453	F10
9454	F10
9455	F10
9456	F10
9457	G7
9509	C6
9511	C5
9512	C4
9513	C6
9516	C7
9518	C6
9522	C5
9523	C4
9524	D4
9525	C5
9526	A4
9530	B3
9531	C3
9532	C4
9533	C4
9534	C6
9535	C6
9536	B6
9537	B6
9538	A6
9539	A6
9540	A4
9541	A6
9542	A4
9543	B3
9544	C3
9545	A6
9546	A6
9561	A3
9562	F7
9563	A6
9565	B7
9620	F10
9621	G10
9622	G10
9623	F10
9624	F10
9625	G10
9626	G10
9627	G10
9629	G10
9701	D10
9702	E10
9705	D8
9706	C10
9722	D8
9723	C9
9724	C8
9725	C9
9726	C9
9729	B8
9730	B8
9731	C7
9732	B7
9733	D8
9738	C7
9740	E8
9741	E8
9742	D9
9743	E8
9747	E8
9748	E8
9749	E8
9750	E8
9751	E8
9752	E8
9753	E8
9754	E8
9755	E9
9756	F9
9757	B8
9759	A7
9760	A8
9761	A8
9764	C8
9765	D8
9821	G9
9822	G9
9823	E8
9824	G6
9825	F8
9826	F8
9827	G7
9828	G7
9829	F8
9830	F8
9831	F8
9832	F8
9833	F8
9836	F8
9837	F8
9838	F8
9900	C10
9903	B10
9920	B10
9921	B9
9922	E10
9923	A10
9924	B9
9925	B9
9927	E8
9928	D10
9929	C10
9930	B10
9931	A10
9932	B9
9933	B10
9934	A10
9936	B9
9937	C10
9940	B10
9942	B9
9943	C10
9944	C10
9945	C8
9946	C9
9948	C10
9949	E8
9950	B10
9952	C10
9953	C9
9957	B9
9958	E9
9959	B9
9960	C10
9961	G9

Solder side

2177	D9
2178	D10
2179	D10
2200	C1
2201	D2
2203	D2
2204	C1
2205	D2
2207	C2
2208	D1
2209	D1
2210	D2
2211	D1
2213	D1
2214	D2
2215	E2
2218	D1
2219	D1
2220	D1
2221	D2
2222	D2
2223	C2
2224	C2
2225	C2
2226	D2
2229	D2
2230	D2
2231	D2
2232	C1
2234	D1
2235	D1
2236	D1
2237	C2
2238	A4
2318	E8
2319	D8
2320	E8
2321	E8
2325	E8
2330	E8
2342	G5
2343	G6
2345	G6
2346	G6
2355	D5
2357	F4
2358	E4
2361	E5
2362	E5
2373	D1
2381	E5
2382	F5
2400	E10
2401	E10
2402	E10
2403	E10
2404	E9
2405	E9
2406	E9
2453	E1
2454	E1
2456	F1
2457	G4
2458	G4
2462	G5
2463	F1
2464	F1
2465	F1
2504	A7
2529	A5
2558	A5
2559	A5
2560	A5
2562	A5
2603	G1
2604	G1
2605	G1
2606	F1
2607	F1
2608	F1
2700	B3
2701	B4
2703	B3
2705	C3
2707	C3
2708	E2
2710	D2
2711	B3
2712	D3
2715	E2
2716	E3
2718	D2
2719	D3
2721	B3
2725	D2
2726	D2
2729	C4
2731	C4
2732	C4
2733	C4
2735	C4
2741	D1
2800	G3
2802	G3
2803	F2
2804	F3
2806	F2
2807	F2
2809	G3
2810	F3
2811	F3
2812	G2
2813	G2
2814	G2
2815	G2
2816	G2
2817	F2
2818	F2
2819	G2
2820	F2
2821	F3
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2902	A2
2903	B2
2904	B2
2907	B1
2908	B1
2909	A1
2910	B1
2911	A1
2912	A1
2913	A1
2914	B1
2916	B1
2917	B1
2918	B1
2919	B1
2920	B2
2921	A1
2922	A1
2923	D1
2924	B1
2925	A2
2951	B2
3169	C10
3170	D9
3171	C9
3172	D10
3173	C10
3174	D10
3175	C9
3176	D10
3183	C9
3184	C9
3188	C10
3194	D10
3195	C10
3200	E2
3201	E2
3202	E2
3203	C1
3204	C1
3205	C2
3208	D1
3209	D2
3210	D2
3211	C2
3212	C2
3213	D1
3216	D2
3217	D2
3218	E1
3219	E1
3220	E1
3221	D1
3222	D1
3223	E2
3224	E2
3226	E1
3227	E1
3228	E1
3229	E1
3230	E1
3231	E2
3232	E1
3233	E2
3234	C2
3237	C2
3239	D2
3242	C2
3243	E2
3244	E2
3245	E2
3247	E2
3248	C2
3249	C2
3250	C2
3251	C1
3252	C1
3254	D1
3255	D1
3256	E1
3317	D8
3318	E8
3319	E8
3321	E8
3330	E8
3331	E8
3336	E8
3341	G5
3342	G5
3343	G5
3344	G6
3346	G6
3347	D6
3355	C5
3356	C5
3357	D5
3358	D5
3362	E5
3363	E4
3371	G4
3372	G4
3373	G3
3375	G3
3381	F4
3382	F4
3383	G5
3384	G5
3385	G5
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3392	E4
3393	E4
3395	E4
3396	E4
3397	E4
3400	E10
3401	E10
3404	E10
3405	E10
3406	E9
3407	E10
3408	E10
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3414	E10
3415	E9
3416	E9
3417	E9
3420	E10
3421	E9
3453	F1
3454	F1
3455	F2
3456	F1
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3463	G4
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3471	F1
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3506	A7
3510	C5
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3528	A4
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3553	A4
3555	A5
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3708	A3
3709	A3
3710	B3
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3712	C2
3713	E2
3714	E3
3715	E2
3716	E2
3717	E2
3718	D2
3720	D2
3723	C3
3724	C3
3725	E2
3728	C3
3729	C3
3730	C3
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3733	B3
3735	C4
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3738	C4
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3741	D3
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3801	G3
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3808	G4
3809	G2
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3917	B1
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3920	B2
3921	A1
3922	B1
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3925	B1
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3927	B1
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3929	A1
3930	A1
3931	A1
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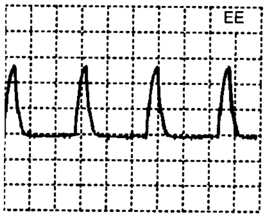
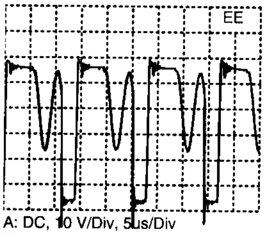
3933	B1
3934	A1
3935	B2
3936	B1
3937	B1
3938	B1
3939	B1
3940	B1
3941	B1
3942	A1
3943	B1
3945	A2
3946	A2
3951	B2
3952	B2
4195	D10
4196	C10
4197	B9
4200	D1
4201	D1
4202	D1
4203	C1
4228	E1
4229	E1
4230	E1
4240	D2
4241	E1
4242	E1
4321	E8
4359	G5
4400	E10
4401	E9
4402	D9
4410	E9
4444	A9
4450	F1
4451	E1
4452	F1
4453	G5
4454	G4
4455	A5
4457	D1
4556	B5
4600	G1
4601	G1
4621	G1
4622	G1
4700	D2
4701	E2
4702	B3
4704	B4
4707	C3
4711	C3
4723	C3
4724	D3
4726	C3
4727	A4
4728	C2
4730	D3
4800	G2
4801	F2
4802	F2
4803	F2
4821	G2
4822	G2
4823	F2
4824	G3
4825	G2
4901	A1
4902	B2
4904	B2
4905	B1
4906	B2
4907	B2
4912	E1
4920	B1
4922	D1
4923	B1
4924	E1
4929	E1
4935	B2
4939	G1
4956	C1
4957	C1
5200	E2
5201	E2
5202	E2
5203	C2
5204	C2
5205	C1
5702	C2
5801	G2
5802	G3
5803	G3
6183	D9
6184	C10
6185	C9
6200	E1
6203	E1
6205	E1
6220	E1
6315	E8
6357	F4
6374	G4
6387	G5
6450	F1
6451	F2
6548	A4
6551	A5
6700	B4
6701	C3
6702	C3
6705	C3
6706	C3
6707	C3
7201	C1
7204	E2
7206	E1
7208	E1
7209	E1
7210	D1
7211	E1
7212	E1
7215	E2
7219	C2
7358	E4
7371	G4
7382	G5
7393	E4
7400	E9
7401	E9
7451	F1
7452	F1
7453	G4
7454	G4
7543	A4
7547	A4
7651	G1
7701	E3
7702	D2
7704	E2
7706	C3
7709	B3
7710	C3
7711	C1
7712	C4
7713	C3
7714	C3
7715	D3
7716	D3
7720	C4
7800	G4
7801	F2
7802	F3
7803	F4
7807	G3
7808	G3
7900	B2
7901	B2
7902	A2
7903	A2
7904	B1
7905	B2
7906	B1
7907	B1
7908	B3
7909	B1

WAVEFORM PHOTOGRAPHS



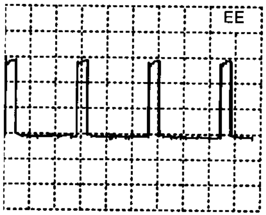
1

A: DC, 5 V/Div, 5us/Div
Transistor 7300 Gate



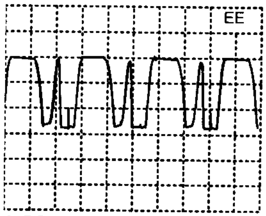
2

A: DC, 10 V/Div, 5us/Div
Pos 5330 Pin 8



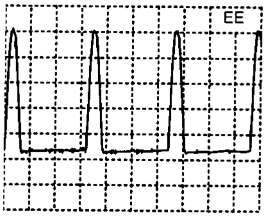
3

A: DC, 5 V/Div, 5us/Div
IC 7310 Pin 5



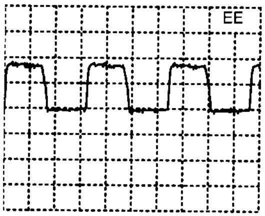
4

A: DC, 1 V/Div, 5us/Div
IC 7310 Pin 2



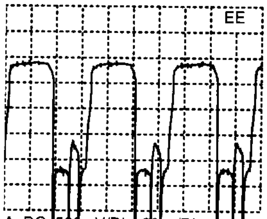
5

A: DC, 5 V/Div, 20us/Div
Conn. 8027 Pin 3 HEATER



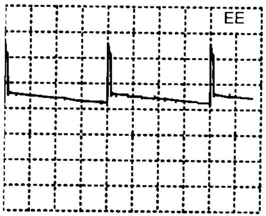
6

A: DC, 500mV/Div, 20us/Div
Transistor 7501 Basis



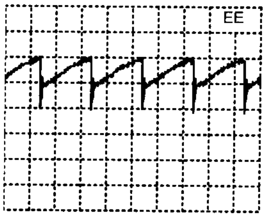
7

A: DC, 500mV/Div, 20us/Div
Transistor 7520 Gate



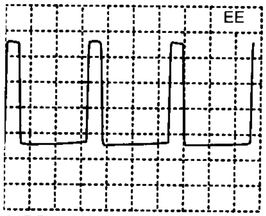
8

A: DC, 20 V/Div, 5ms/Div
IC 7555 Pin 7



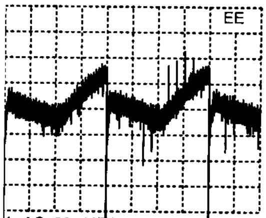
9

A: DC, 5 V/Div, 10ms/Div
IC 7555 Pin 9



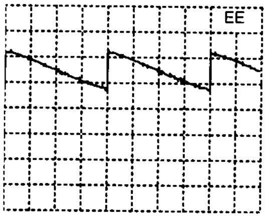
10

A: DC, 2 V/Div, 20us/Div
Resistor 3526



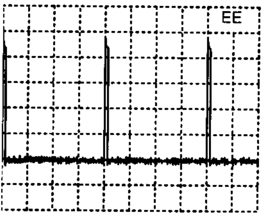
11

A: AC, 20mV/Div, 5ms/Div
Resistor 3555



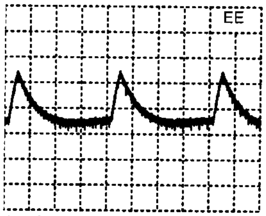
12

A: DC, 1 V/Div, 5ms/Div
Resistor 3556



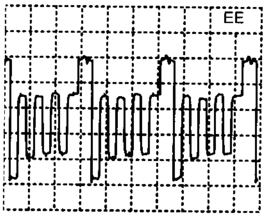
13

A: DC, 1 V/Div, 5ms/Div
Resistor 3569



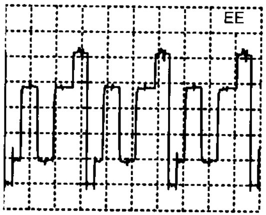
14

A: AC, 500mV/Div, 5ms/Div
Conn. 8027 Pin 4 AQUADAG



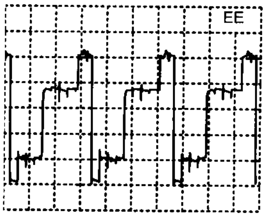
15

A: AC, 10 V/Div, 20us/Div
Transistor 7186 Emitter



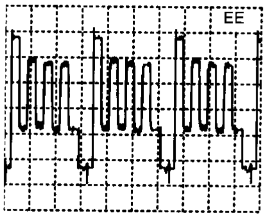
16

A: AC, 10 V/Div, 20us/Div
Transistor 7187 Emitter



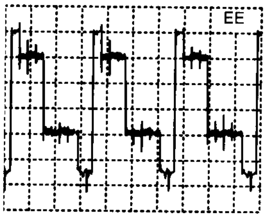
17

A: AC, 10 V/Div, 20us/Div
Transistor 7188 Emitter



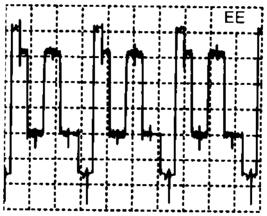
18

A: AC, 500mV/Div, 20us/Div
Conn. 8028 Pin 3 BLUE



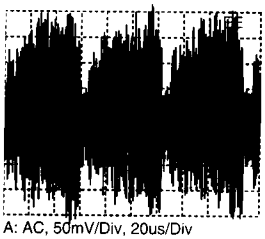
19

A: AC, 500mV/Div, 20us/Div
Conn. 8028 Pin 4 GREEN



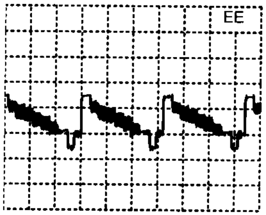
20

A: AC, 500mV/Div, 20us/Div
Conn. 8028 Pin 5 RED



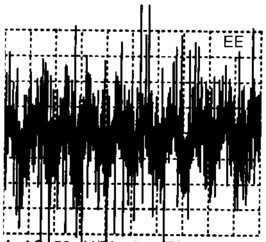
21

A: AC, 50mV/Div, 20us/Div
Tuner 1701 Pin 11



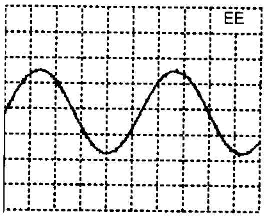
22

A: DC, 500mV/Div, 20us/Div
Transistor 7704 Emitter



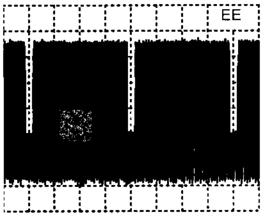
23

A: AC, 50mV/Div, 1ms/Div
IC 7205 Pin 2

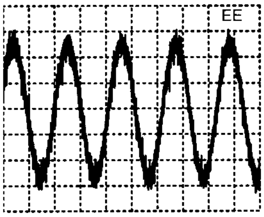


24

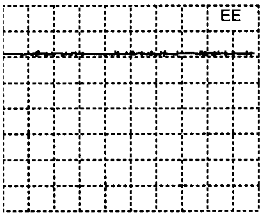
A: AC, 1 V/Div, 200us/Div
Transistor 7711 Kollektor

25


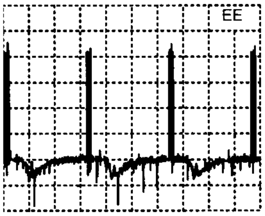
A: DC, 200mV/Div, 5ms/Div
Scart 1978 Pin 20 VideoIn

26


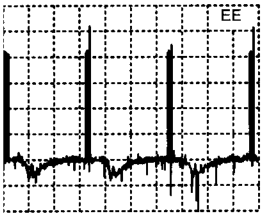
A: AC, 200mV/Div, 500us/Div
Scart 1978 Pin 2 AudInR

27


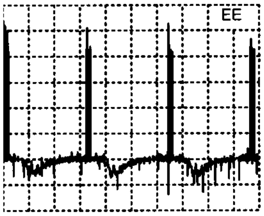
A: DC, 5 V/Div, 20us/Div
IC 7450 Pin 1 IR

30


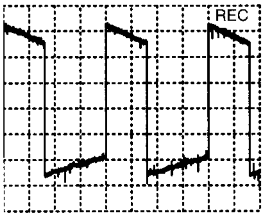
A: AC, 100mV/Div, 20us/Div
IC 7804 Pin 32 B

31


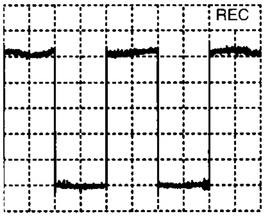
A: DC, 100mV/Div, 20us/Div
IC 7804 Pin 33 G

32


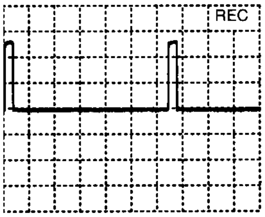
A: DC, 100mV/Div, 20us/Div
IC 7804 Pin 34 R

50


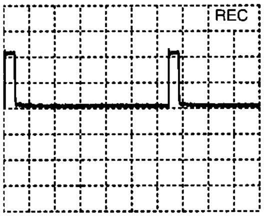
A: AC, 1 V/Div, 10ms/Div
Resistor 3871

51


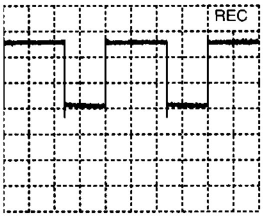
A: DC, 1 V/Div, 10ms/Div
Ic 7900/pin 86

52


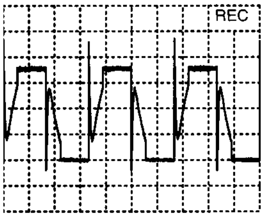
A: DC, 2 V/Div, 10us/Div
Resistor 3885

53


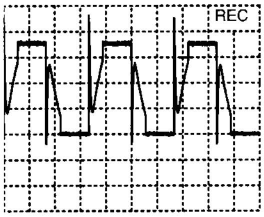
A: DC, 2 V/Div, 10us/Div
Csync from VS

54


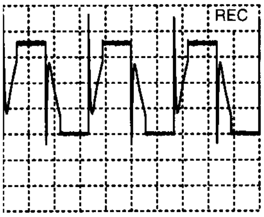
A: DC, 2 V/Div, 10ms/Div
IC 7443 Pin 2

55


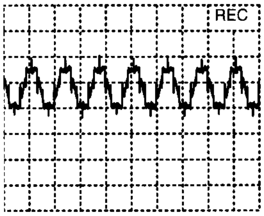
A: DC, 2 V/Div, 2ms/Div
IC 7446 PIN 18

56


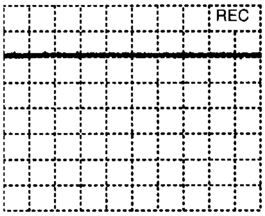
A: DC, 2 V/Div, 2ms/Div
IC 7446 PIN 16

57


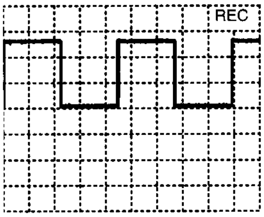
A: DC, 2 V/Div, 2ms/Div
Conn. 1948 PIN 3

58


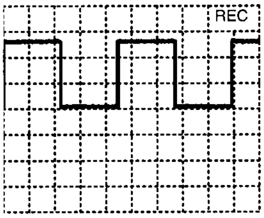
A: DC, 5 V/Div, 5ms/Div
Conn. 1948 PIN 4

59


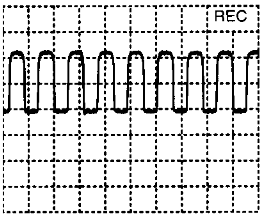
A: DC, 1 V/Div, 5ms/Div
IC 7446 PIN 13

60


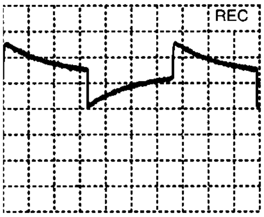
A: DC, 2 V/Div, 500us/Div
IC 7446 PIN 5

61


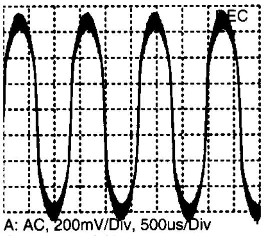
A: DC, 2 V/Div, 500us/Div
Resistor 3476

62


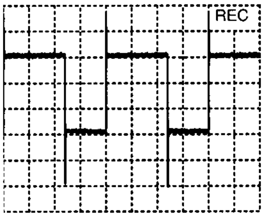
A: DC, 2 V/Div, 500ms/Div
Resistor 3462

63


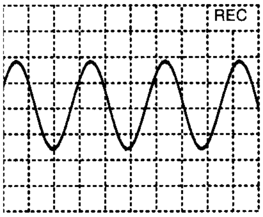
A: DC, 500mV/Div, 200us/Div
IC 7443 PIN 7

64


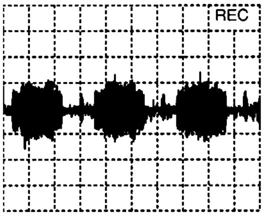
A: AC, 200mV/Div, 500us/Div
Conn. 1946 PIN 4

67


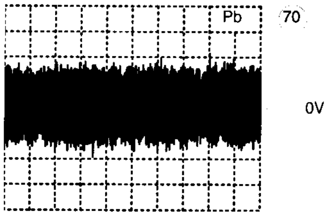
A: DC, 1 V/Div, 10ms/Div
Conn. 1965 PIN 7

68


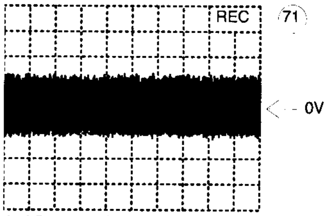
A: DC, 20 V/Div, 5us/Div
Conn. 1965 PIN 1

69


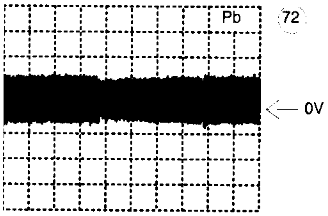
A: AC, 200mV/Div, 20us/Div
C. 2042



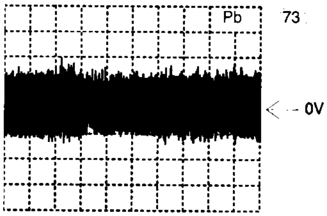
A: AC, 200mV/Div, 20us/Div
C. 2943



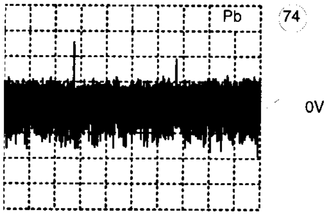
A: AC, 200mV/Div, 20us/Div
IC 7004 Pin 18



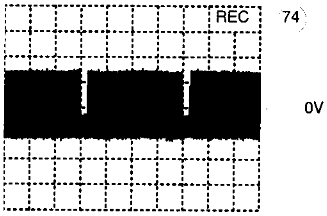
A: AC, 200mV/Div, 5ms/Div
Transistor 7011 Basis



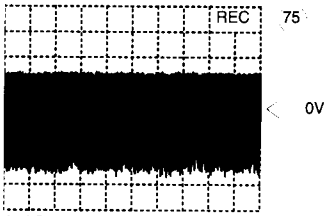
A: AC, 200mV/Div, 5ms/Div
IC 7007 Pin 20



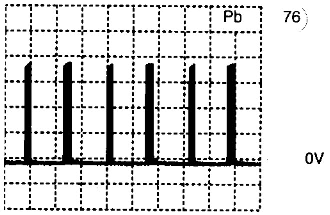
A: AC, 200mV/Div, 5ms/Div
Transistor 7005 Emi.



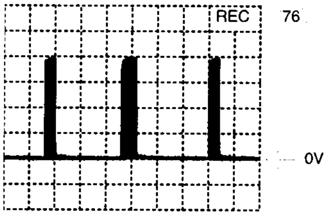
A: AC, 200mV/Div, 5ms/Div
Transistor 7005 Emi.



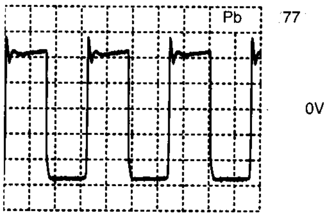
A: AC, 500mV/Div, 10us/Div
IC 7004 Pin 32



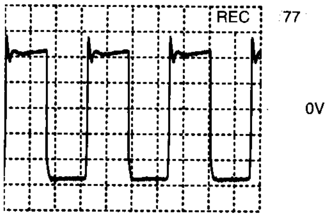
A: AC, 1 V/Div, 20us/Div
IC 7004 Pin 37



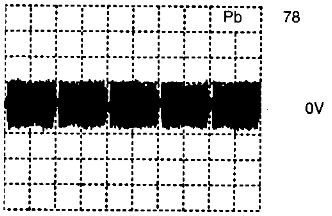
A: AC, 1 V/Div, 10us/Div
IC 7004 PIN 37



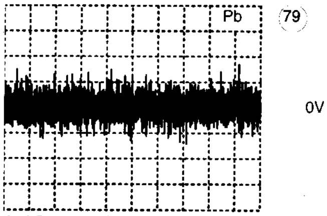
A: AC, 10 V/Div, 20us/Div
Transistor 7501 C



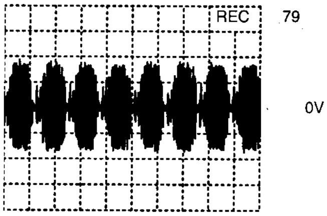
A: AC, 10 V/Div, 20us/Div
Transistor 7501 C



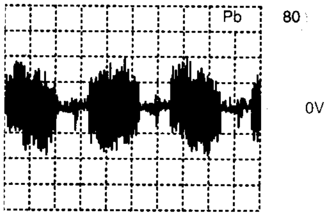
A: AC, 200mV/Div, 10ms/Div
IC 7004 Pin 46



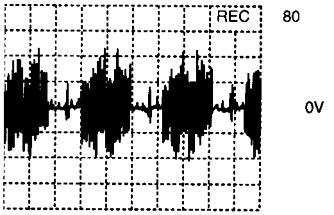
A: AC, 100mV/Div, 500us/Div
IC 7004 Pin 50/48



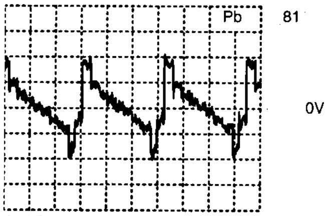
A: AC, 100mV/Div, 50us/Div
IC 7004 Pin 50/48



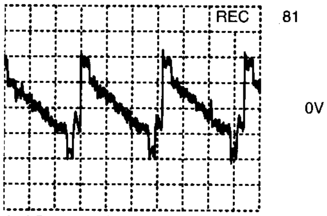
A: AC, 100mV/Div, 20us/Div
IC 7004 Pin 52



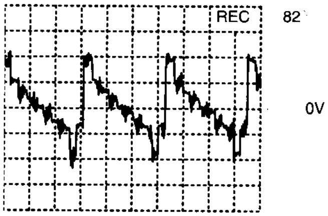
A: AC, 100mV/Div, 20us/Div
IC 7004 Pin 52



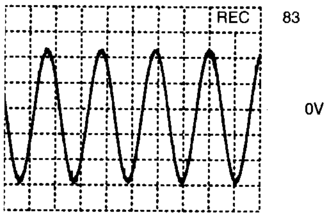
A: AC, 100mV/Div, 20us/Div
IC 7002 Pin 5



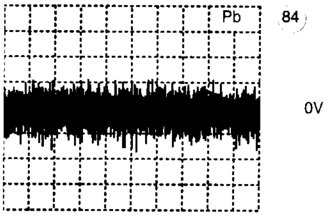
A: AC, 100mV/Div, 20us/Div
IC 7002 Pin 5



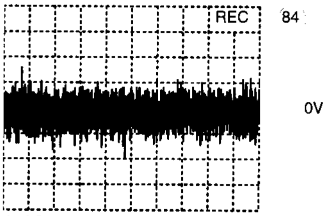
A: AC, 100mV/Div, 20us/Div
IC 7004 Pin 40



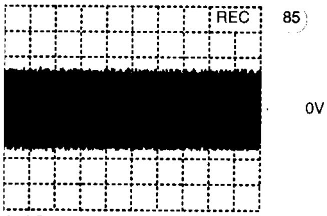
A: AC, 200mV/Div, 500us/Div
Resistor 3643



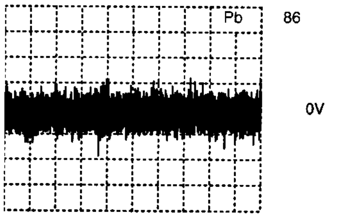
A: AC, 50mV/Div, 200us/Div
C. 2611



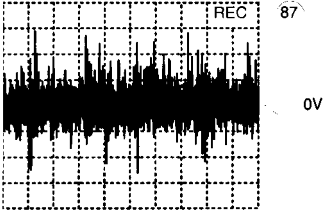
A: AC, 50mV/Div, 200us/Div
C. 2611



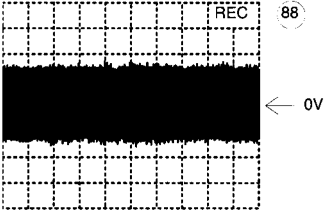
A: AC, 200mV/Div, 100us/Div
IC 7072 Pin 2



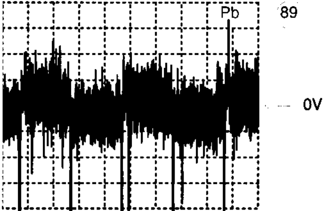
A: AC, 100mV/Div, 100us/Div
IC 7072 Pin 13



A: AC, 50mV/Div, 2us/Div
Resistor 3078



A: AC, 1 V/Div, 2us/Div
IC 7104 Pin 1



A: AC, 200mV/Div, 10ms/Div
IC 7104 PIN14

V. EXPLODED VIEWS

1. DECK EXPLODED VIEW (TOP)

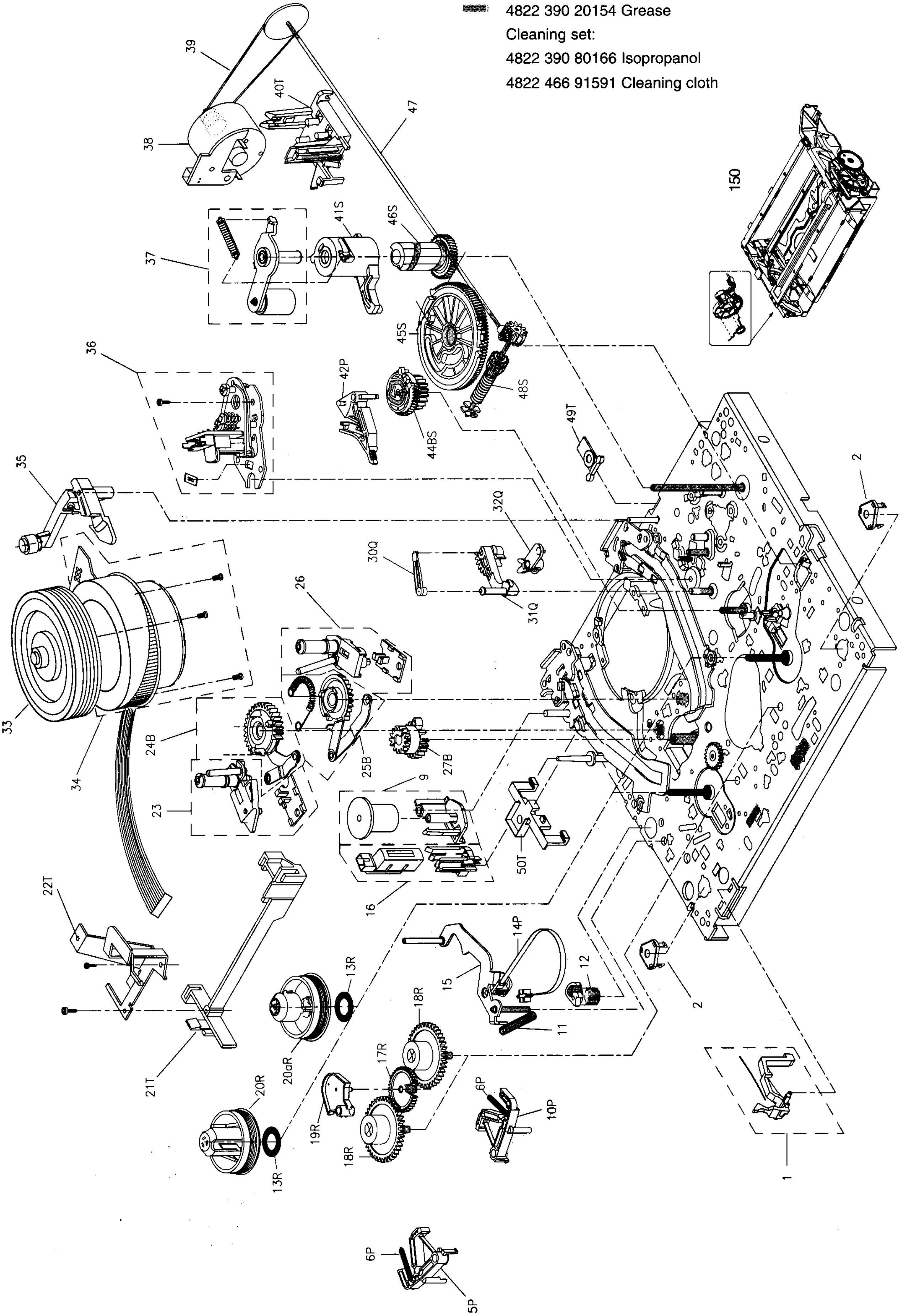
■ 5322 390 10096 Oil

▨ 4822 390 20154 Grease

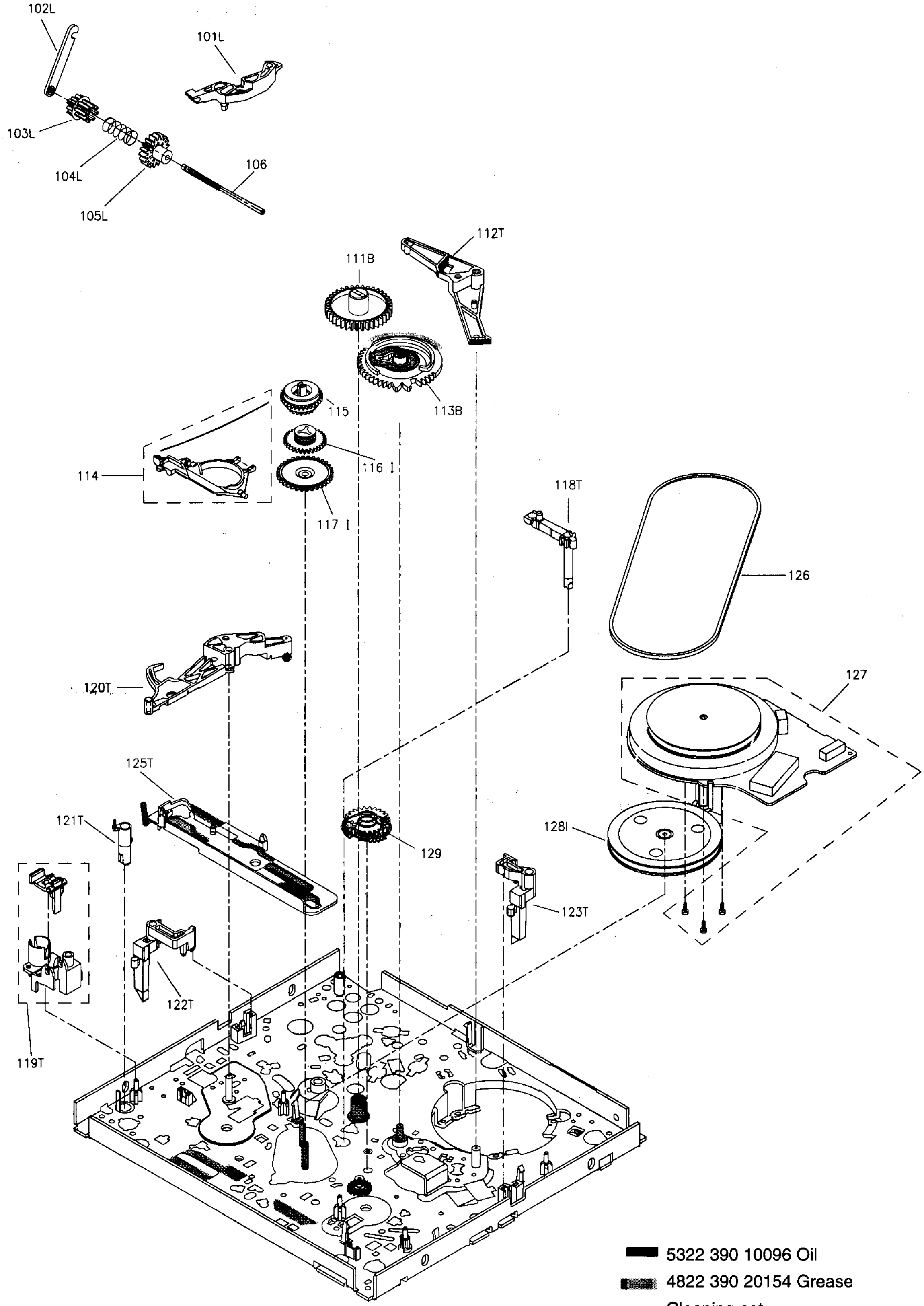
Cleaning set:

4822 390 80166 Isopropanol

4822 466 91591 Cleaning cloth


39
40T
47
38
41S
46S
37
150
45S
36
42P
48S
44BS
49T
35
2
32Q
30Q
31Q
26
33
34
24B
25B
27B
9
23
50T
16
22T
14P
12
13R
15
18R
11
2
21T
20aR
17R
6P
10P
20R
19R
18R
13R
1
6P
5P

2. DECK EXPLODED VIEW (BOTTOM)


102L
101L
103L
104L
106
105L
112T
111B
115
113B
116 I
114
117 I
118T
126
120T
127
125T
121T
129
128I
123T
122T
119T

■ 5322 390 10096 Oil

▨ 4822 390 20154 Grease

Cleaning set:

4822 390 80166 Isopropanol

4822 466 91591 Cleaning cloth

3. MECHANICAL PARTS LIST

Pos.	Description	KITS								Code number
		B	I	L	P	Q	R	S	T	4822
1	Rec. protection lever (with spring)									402 10202
2	Chassis mounting spring (2x)									492 71022
5	Main brake left				P					
6	Main brake spring (2x)				P					
9	Damping roller *)									528 70782
10	Main brake right				P					
11	Tension arm spring									492 33317
12	Tension crank									403 70551
13	Slip ring						R			
14	Tension band				P					
15	Tension arm									403 70547
16	Erase head									249 10522
17	Swivelling gear						R			
18	Brake gear (2x)						R			
19	Swivelling plate						R			
20	Reel table (S)						R			
20a	Reel table (T)						R			
21	Headamplifier holder								T	
22	Bracket								T	
23	Roller unit left									528 70771
24	Loading arm left	B								
25	Loading arm right	B								
26	Roller unit right									528 70772
27	Loading gear	B								
30	Reverse clip					Q				
31	Reverse lever					Q				
32	Intermediate lever					Q				
33	Head disc 2/0									691 10583
33	Head disc 2/0-LP									691 10585
34	Scanner motor 2/0 (with screws)									361 10963
34	Scanner assy. 4/0 (Head disc and motor)									218 12031
34	Scanner assy. 4/2 (Head disc and motor)									218 12032
35	Cleaning roller									528 70773
36	A/C Head (with clip and screws)									249 10468
37	Pressure roller (with spring)									528 70774
38	Threading motor									361 10809
39	Threading belt									358 20421
40	Motor holder								T	
41	Pressure roller guide							S		
42	Reverse brake				P					
44	Slider gear	B						S		
45	Cam wheel							S		
46	Cam shaft							S		
47	Pulley shaft									528 81462
48	Worm shaft							S		
49	Chassis mounting clip								T	
50	WD-holder								T	

Pos.	Description	KITS								Code number
		B	I	L	P	Q	R	S	T	4822
101	Cassette loader trigger			L						
102	Clip			L						
103	Cassette loader gear1			L						
104	Cassette loader spring			L						
105	Cassette loader gear2			L						
106	Spindle									535 93277
111	Cam wheel reverse	B								
112	Tension lever								T	
113	Cam wheel tension	B								
114	Clutch lever (with spring)									403 70549
115	Clutch									528 20736
116	Changing gear		I							
117	Double gear		I							
118	Light prism								T	
119	Init flap and holder								T	
120	Cam wheel lever								T	
121	S-VHS lever								T	
122	Prism rihgt								T	
123	Prism left								T	
125	Main slider								T	
126	Driving belt									358 31166
127	Capstan motor (with screws)									361 10805
129	Reverse kicker with transmission gears *)									522 20451
128	Gear pulley		I							
150	Lift									443 64112
KIT	B									310 31955
KIT	I									310 31963
KIT	L									310 32116
KIT	P									310 32191
KIT	Q									310 10658
KIT	R									310 10659
KIT	S									310 10661
KIT	T									310 10662

*) optional

Um eine hohen Reparaturstandard zu gewährleisten sind mit Ausnahme von Kit T immer alle im Kit enthaltenen Teile zu tauschen.

In order to guarantee a high repairstandard all spare parts included in a kit have to be replaced with the exception of kit T.

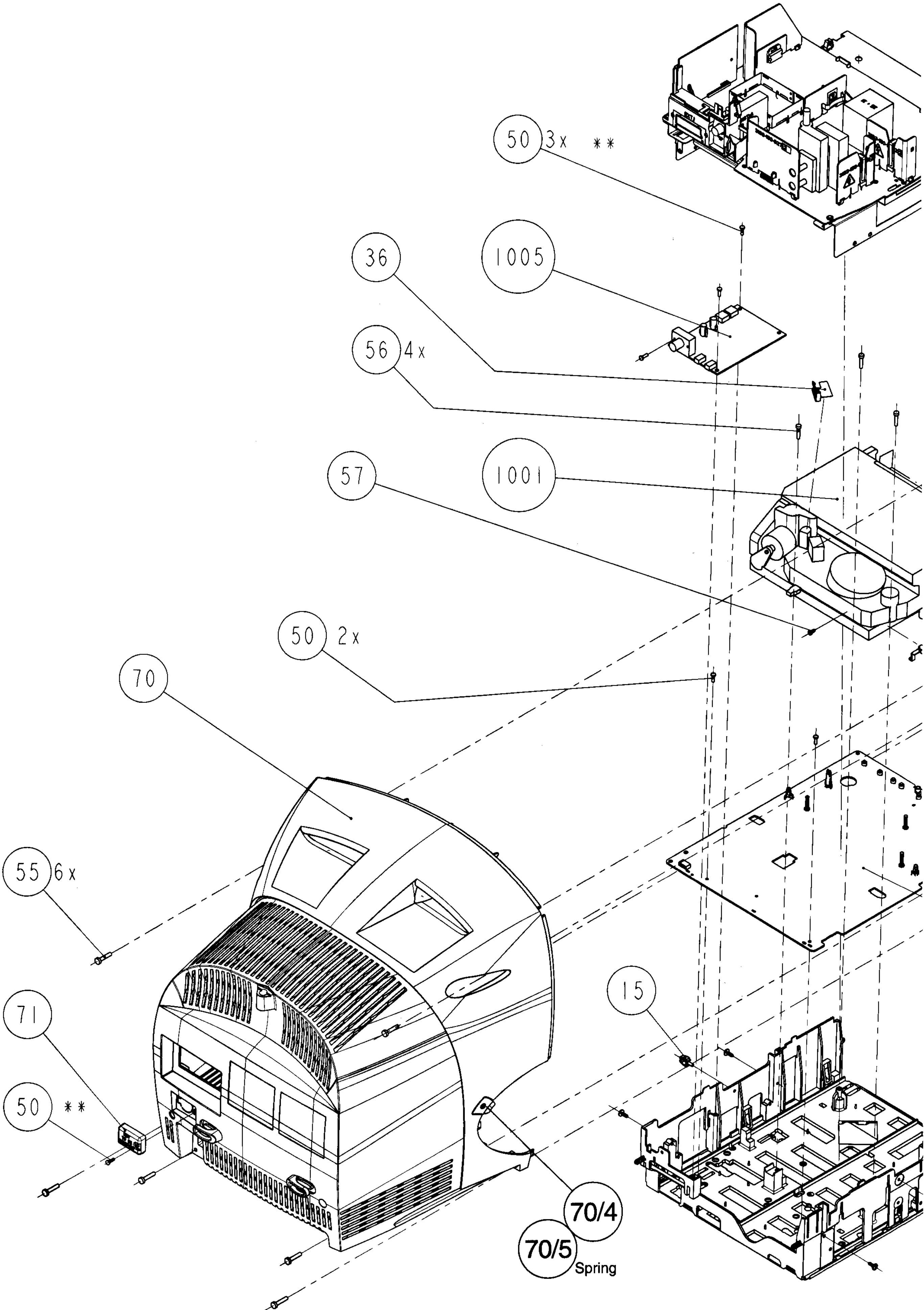
Per una riparazione garantita ocorre sostituire tutti i pezzi contenuti nei kit, fatta eccetione per il kit T.

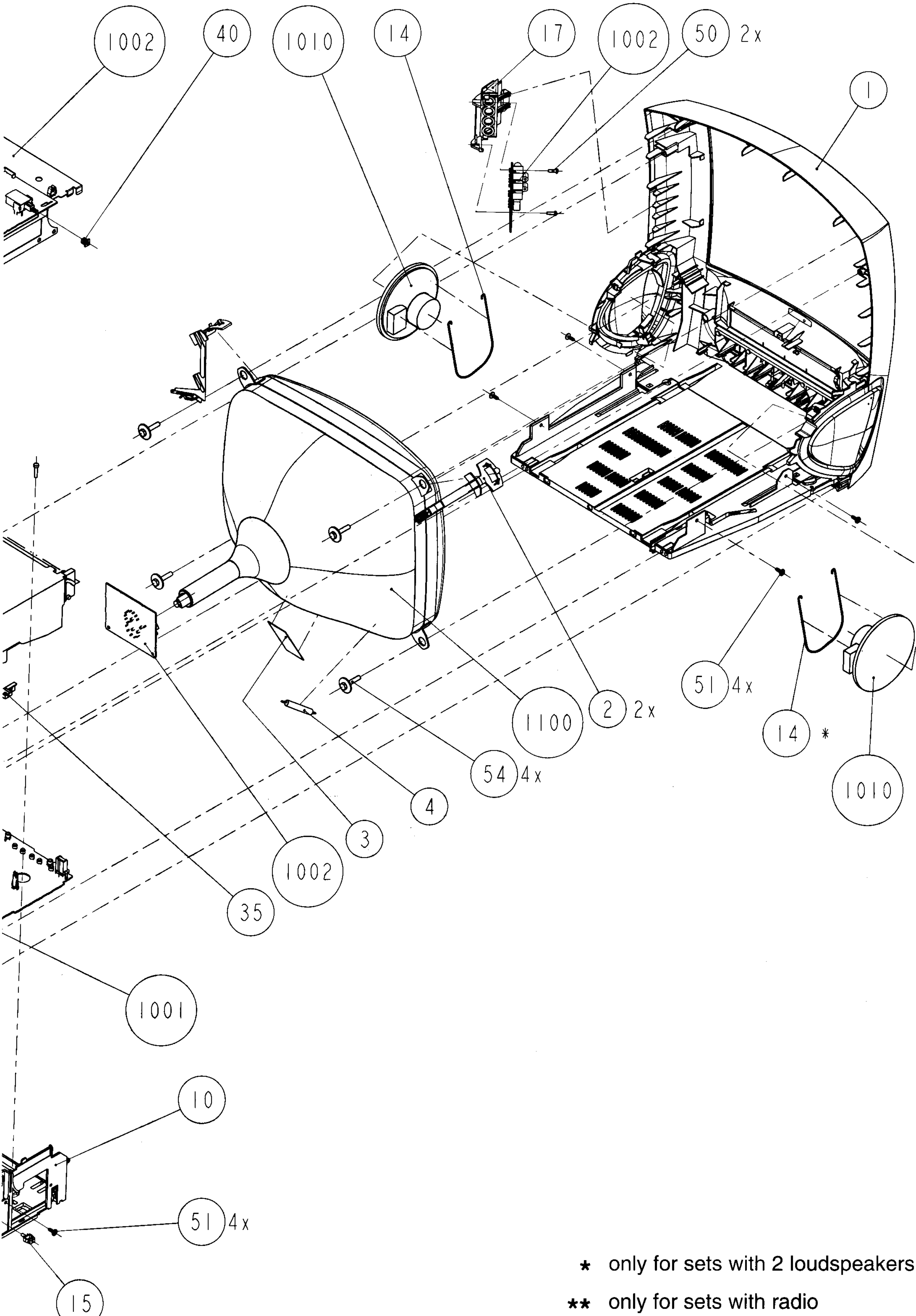
Para obtener un estandár de reparaciones elevado,es necesario cambiar todas las partes contenidas en el kit, la única exceptión es para el kit T.

A fin d'obtenir un standard de réparations élevé, toutes les pièces de rechange incluses dans un kit sont à remplacer, exception faite du kit T.

Om een hoge reparatiekwaliteit te waarbogen moeten, met uitzondering van kit T, altijd alle zich in een kit bevindende onderdelen worden vervangen.

CHASSIS EXPLODED VIEW 14"

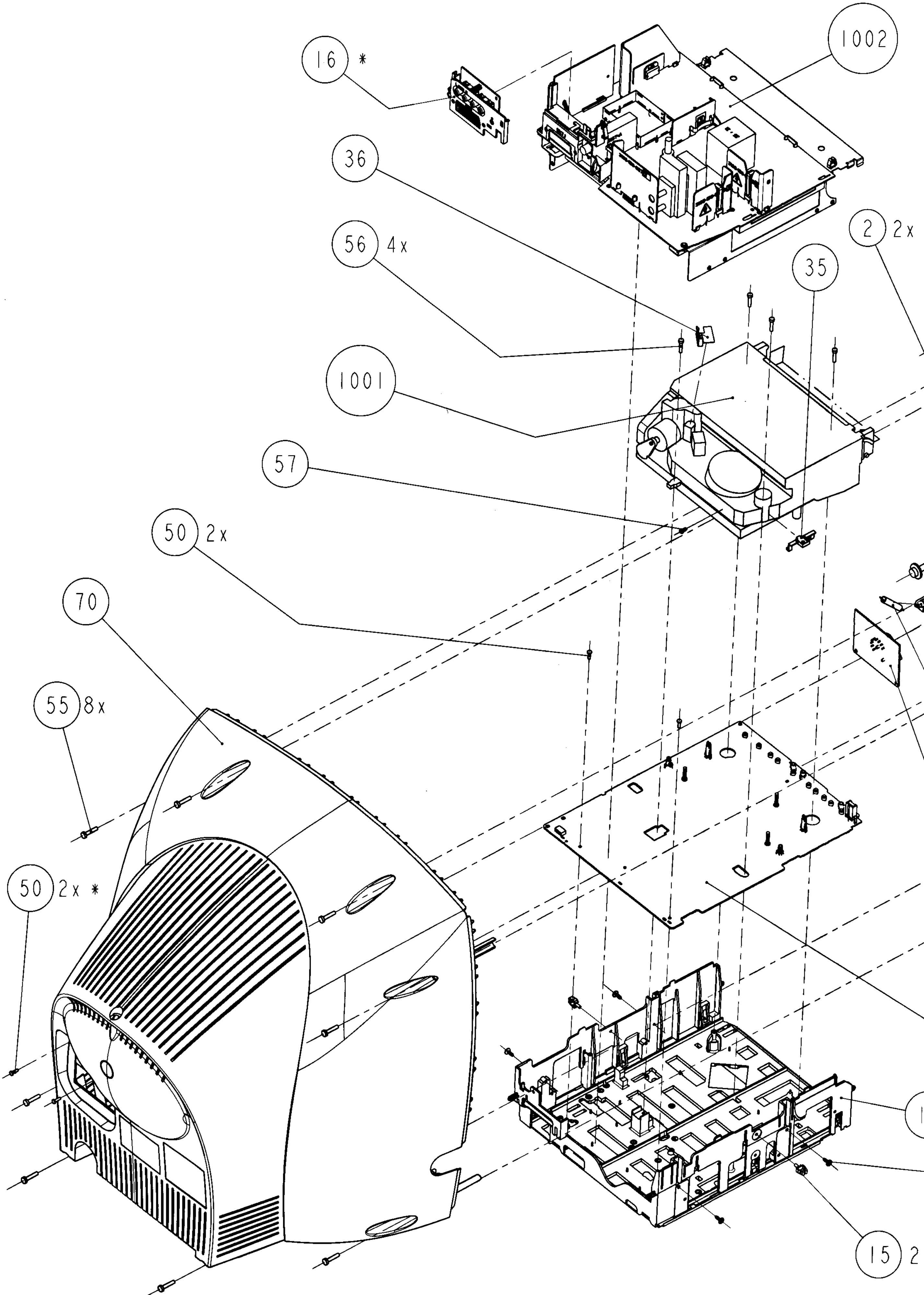

50 3x **
36
1005
56 4x
57
1001
50 2x
70
55 6x
71
50 **
15
70/4
70/5
Spring


1002
40
1010
14
17
1002
50 2x
1
1100
2 2x
51 4x
14 *
1010
54 4x
4
3
1002
35
1001
10
51 4x
15

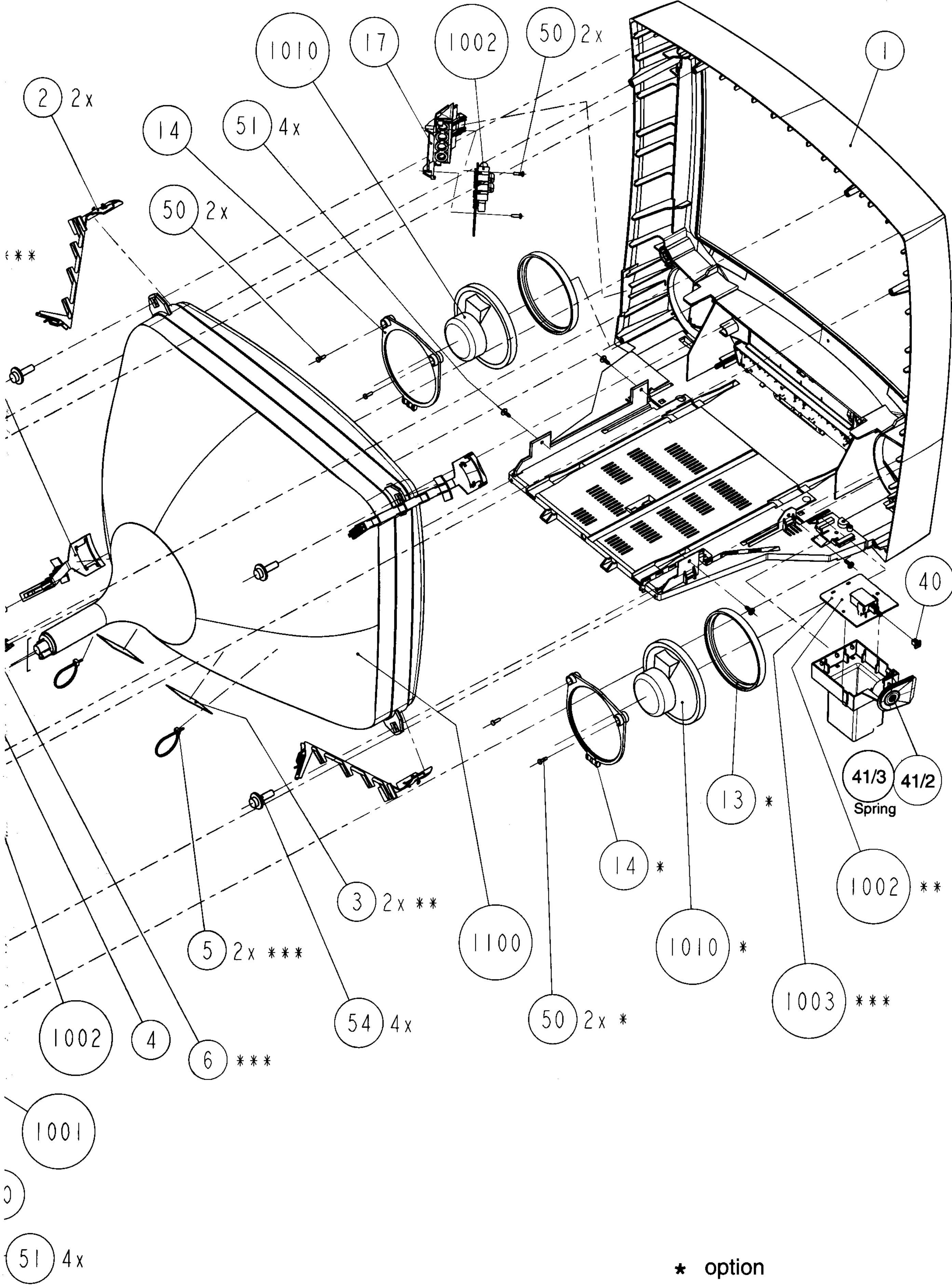
* only for sets with 2 loudspeakers

** only for sets with radio

CHASSIS EXPLODED VIEW 20-25"



16 *
1002
36
56 4x
2 2x
35
1001
57
50 2x
70
55 8x
50 2x *
1
15 2

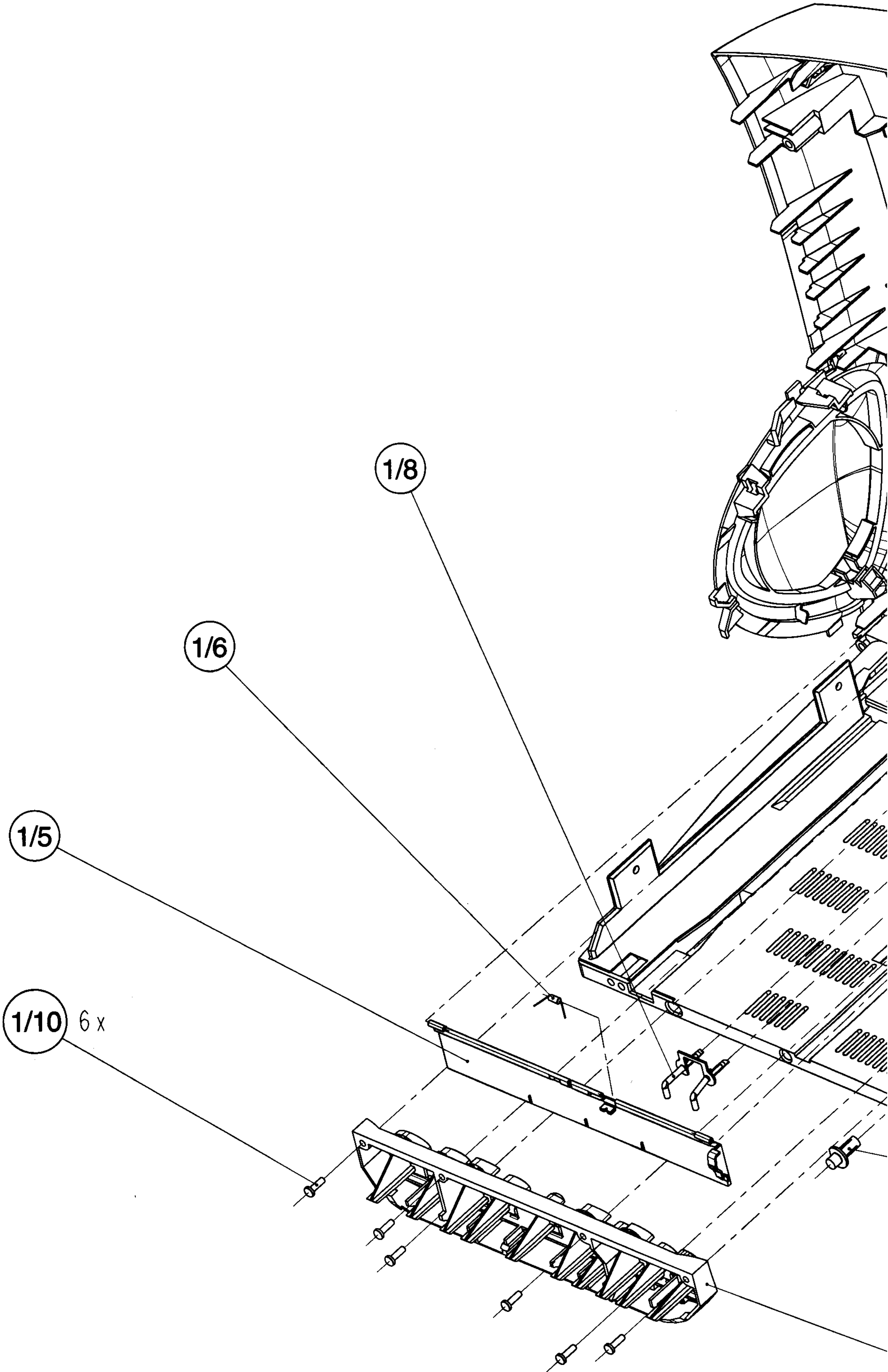

1010
17
1002
50 2x
1
2 2x
14
51 4x
50 2x
***
40
41/3
41/2
Spring
13 *
14 *
1002 **
3 2x **
1100
1010 *
5 2x ***
1003 ***
54 4x
50 2x *
1002
4
6 ***
1001
51 4x

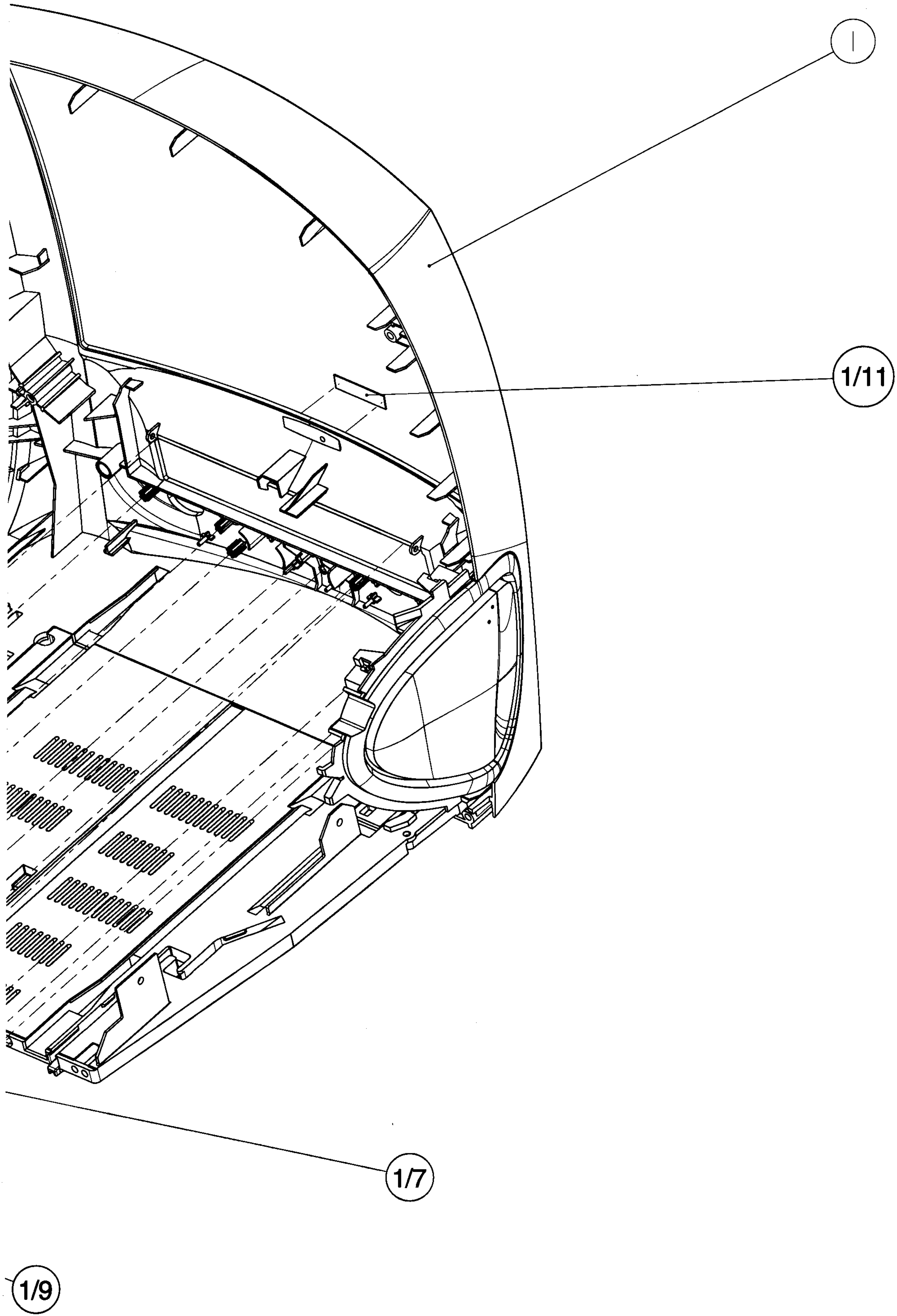
* option

** only for 20" and 21 sets

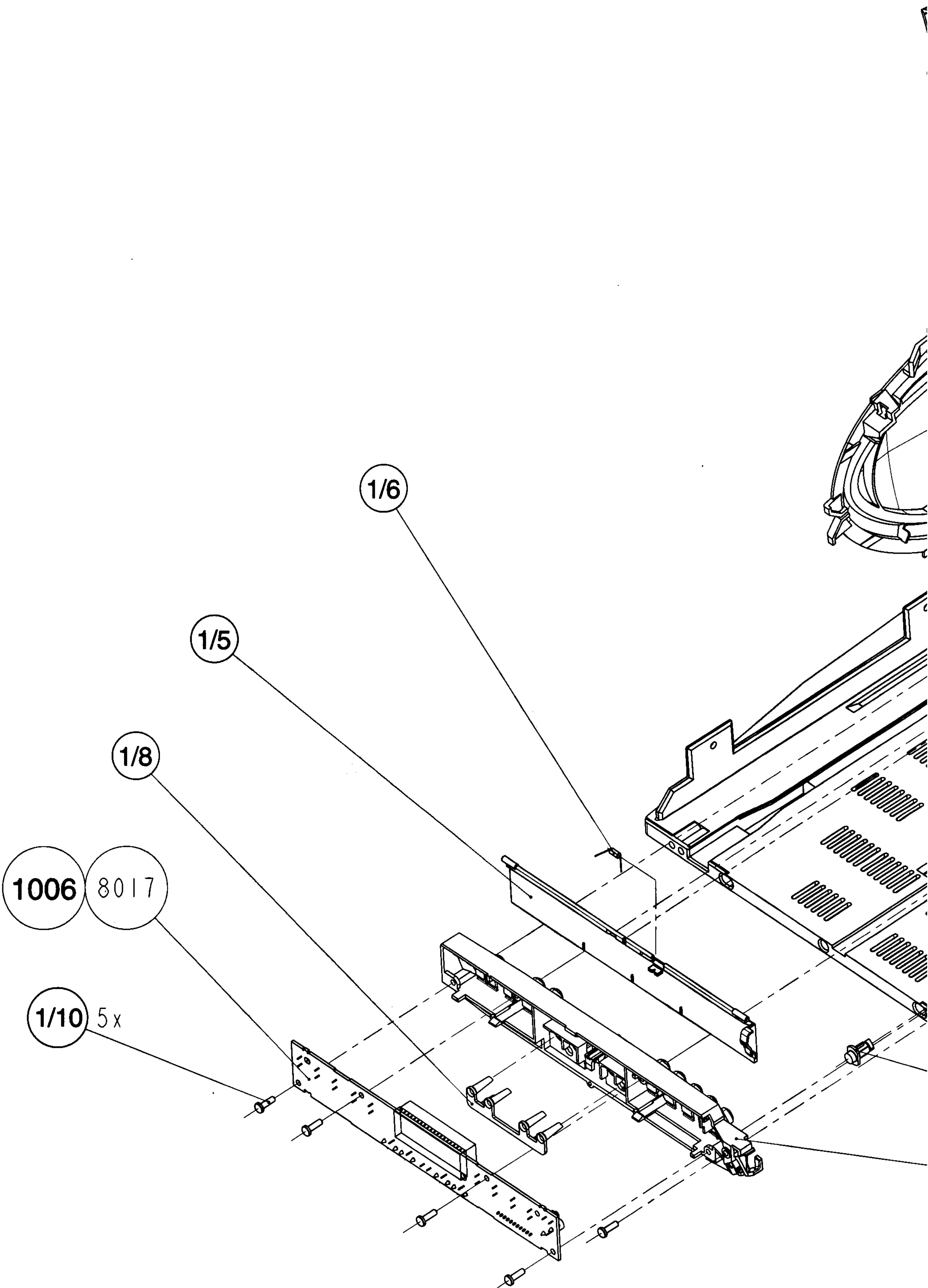
*** only for 25" sets

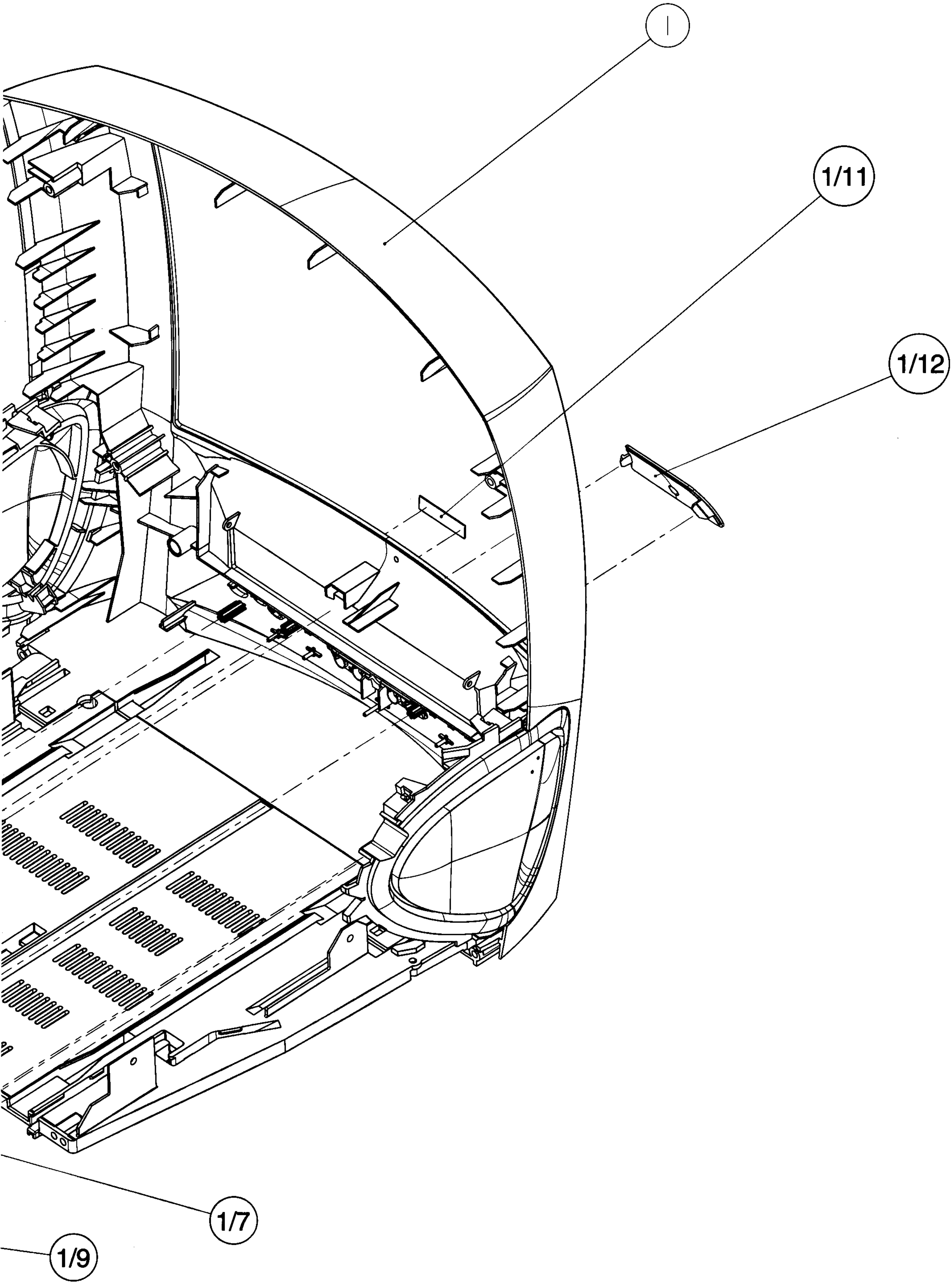
FRONT EXPLODED VIEW 14" (for sets without key board)


1/8
1/6
1/5
1/10
6 x

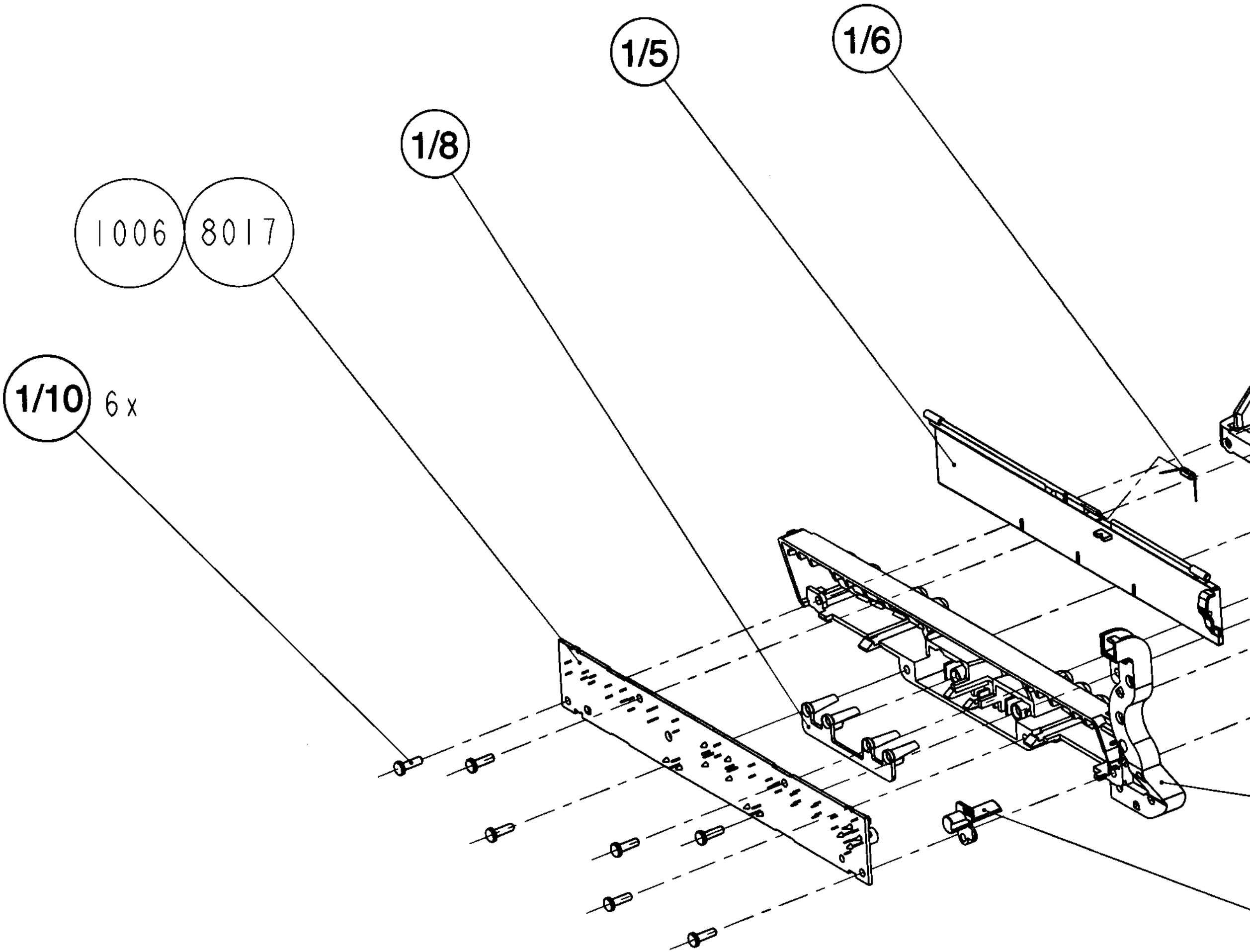

1
1/11
1/7
1/9

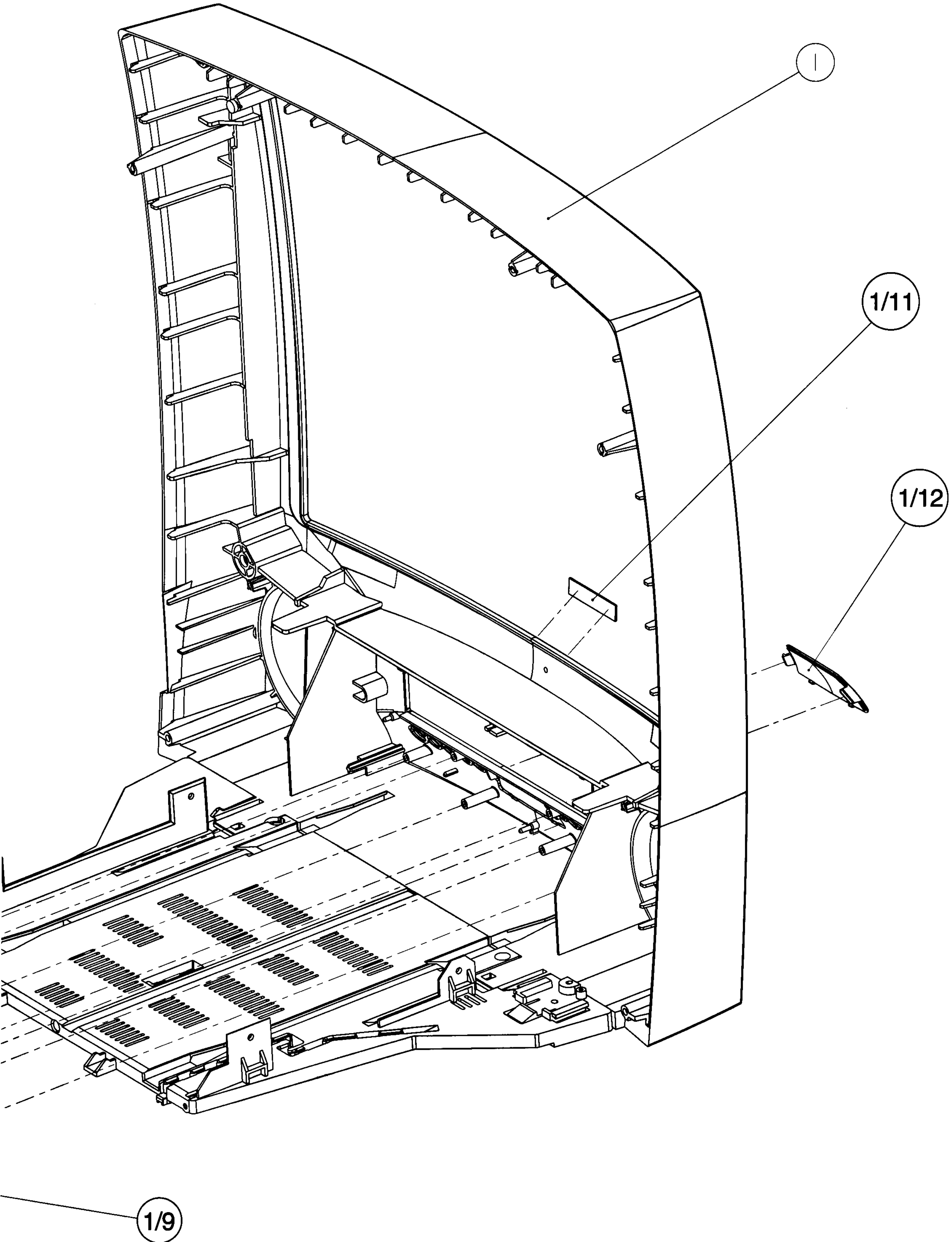
FRONT EXPLODED VIEW 14" (for sets with key board)


1/6
1/5
1/8
1006
8017
1/10 5x


1
1/11
1/12
1/7
1/9

FRONT EXPLODED VIEW 20",21",25"


1/5
1/6
1/8
1006
8017
1/10
6 x


1
1/11
1/12
1/9

SET PARTS LIST

Pos	⚠	Service Code	Description	14PV210/01	14PV210/07	14PV210/39	14PV210/58	14PV210/75	14PV210/75S	14PV320/01	14PV320/05	14PV320/39	14PV325/05S
			FRAME AND CABINET PARTS										
1		310315093640	CABINET ASSY										
1		310315093250	CABINET ASSY								1		
1		310315093550	CABINET ASSY										
1		310315093600	CABINET ASSY										
1		310315092890	CABINET ASSY		1								
1		310315093380	CABINET ASSY										
1		310315093700	CABINET ASSY										
1		310315093260	CABINET ASSY									1	
1		310315093270	CABINET ASSY										
1		310315093280	CABINET ASSY										
1		310315092900	CABINET ASSY							1			
1		310315093560	CABINET ASSY										
1		310315093740	CABINET ASSY										
1		310315092870	CABINET ASSY	1									
1		310315093980	CABINET ASSY BLUE										
1		310315093400	CABINET ASSY SILVER										1
1		310315092800	CABINET ASSY			1							
1		310315092880	CABINET ASSY				1						
1		310315093990	CABINET ASSY BLUE										
1		310315093360	CABINET ASSY										
1		310315093570	CABINET ASSY										
1		310315093690	CABINET ASSY										
1		310315093370	CABINET ASSY										
1		310315093720	CABINET ASSY										
1		310315093710	CABINET ASSY										
1		310315093410	CABINET ASSY SILVER										
1		310315092910	CABINET ASSY										
1		310315093580	CABINET ASSY										
1		310315093880	CABINET ASSY SILVER										
1		310315093590	CABINET ASSY										
1		310315093870	CABINET ASSY SILVER										
1		310315093750	CABINET ASSY										
1		310315093620	CABINET ASSY					1					
1		310315093630	CABINET ASSY						1				
1/5		310315032330	LIFT FLAP		1					1			
1/5		310315032570	LIFT FLAP										
1/5		310315032430	LIFT FLAP							1			
1/5		310315032320	LIFT FLAP				1					1	
1/5		310315032680	LIFT FLAP										
1/5		310315032380	LIFT FLAP			1							
1/5		310315032700	LIFT FLAP										
1/5		310315032580	LIFT FLAP										
1/5		310315032840	LIFT FLAP BLUE										
1/5		310315032590	LIFT FLAP										
1/5		310315032440	LIFT FLAP									1	
1/5		310315032690	LIFT FLAP										
1/5		310315032820	LIFT FLAP BLUE										
1/5		310315032650	LIFT FLAP SILVER										
1/5		310315032300	LIFT FLAP	1					1				
1/5		310315032670	LIFT FLAP										
1/5		310315032640	LIFT FLAP SILVER										1
1/5		310315032760	LIFT FLAP					1	1				
1/6		482249270896	LIFT FLAP SPRING	1	1	1	1	1	1	1	1	1	1
1/9		310315032390	KEY-SET ASSY	1	1	1	1						
1/9		310315032370	KEY-SET ASSY					1	1	1	1	1	
1/9		310315032600	KEY-SET ASSY										
1/9		310315032780	KEY-SET ASSY SILVER										
1/9		310315032770	KEY-SET ASSY										

14PV325/39S	14PV327/05B	14PV327/39B	14PV340/01	14PV340/05	14PV340/39	14PV340/58	14PV345/05S	14PV345/39S	20PV220/01	20PV220/07	21PV210/75	21PV210/75S	21PV320/01	21PV320/05	21PV320/39	21PV520/58	25PV720/07	25PV720/39	37TR215/03	37TR215/39	37TVB50/39	51TR225/03	51TR225/39	51TVB60/39
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											1	1	1	1	1	1								
							1	1																
																			1	1	1			

Pos	⚠	Service Code	Description	14PV210/01	14PV210/07	14PV210/39	14PV210/58	14PV210/75	14PV210/75S	14PV320/01	14PV320/05	14PV320/39
1/9		310315032360	KEY-SET ASSY									
1/9		310315032620	KEY-SET ASSY									
1/9		310315032480	KEY-SET ASSY									
1/9		310315032490	KEY-SET ASSY									
1/11		310311001360	WORDMARK PHILIPS									
1/11		310311001370	WORDMARK PHILIPS	1	1	1	1	1	1	1	1	1
1/11		312222000510	WORDMARK ARISTONA									
1/11		312222000520	WORDMARK ARISTONA									
1/11		482245910982	WORDMARK RADIOLA (35MM)									
1/11		312222000240	WORDMARK RADIOLA (47MM)									
1/11		482245910983	WORDMARK SCHNEIDER (35MM)									
1/11		312222000270	WORDMARK SCHNEIDER (47MM)									
1/12		310315032560	WINDOW ASSY									
1/12		310315032830	WINDOW ASSY									
1/12		310315032420	WINDOW ASSY							1	1	1
1/12		310315032720	WINDOW ASSY									
1/12		310315032450	WINDOW ASSY									
1/12		310315032740	WINDOW ASSY					1				
1/12		310315032750	WINDOW ASSY						1			
2	⚠	482240210174	BRACKET 14"	2	2	2	2	2	2	2	2	2
2	⚠	482240210159	BRACKET 20,21,25"									
4		482249211069	SPRING	1	1	1	1	1	1	1	1	1
40		482240210196	EXTENSION	1	1	1	1	1	1	1	1	1
41/2		310315011050	ON/OFF KNOB 20,21,25"									
41/3		482249232656	COMPRESSION SPRING									
70		310315093240	BACK-COVER ASSY									
70		310315093670	BACK-COVER ASSY									
70		310315093860	BACK-COVER ASSY									
70		310315093220	BACK-COVER ASSY									
70		310315092840	BACK-COVER ASSY	1	1	1	1	1	1	1	1	1
70		310315094000	BACK-COVER ASSY									
70		310315093310	BACK-COVER ASSY									
70/4		310315012030	ON/OFF KNOB 14"	1	1	1	1	1	1	1	1	1
70/4		310315012530	ON/OFF KNOB 14" SILVER									
70/4		310315032790	ON/OFF KNOB 14" BLUE									
70/5		482249232656	COMPRESSION SPRING	1	1	1	1	1	1	1	1	1
54		482250221546	CRT SCREW 14"	4	4	4	4	4	4	4	4	4
54		482250214061	CRT SCREW 20,21"									
54		482250214071	CRT SCREW 25"									
55		482250214062	CABINET SCREW	6	6	6	6	6	6	6	6	6
71		310315012070	COVER (RADIO)									
1010		482224030716	LOUDSPEAKER 8R 3W	1	1	1	1	1	1	1	1	1
1010		244126400271	LOUDSPEAKER 8R 6W									
			REMOTE CONTROLS									
150/3		862266790101	REMOTE CONTROL RT790/101	1	1	1	1	1	1	1	1	1
150/3		862266790201	REMOTE CONTROL RT790/201									
150/3		862266791101	REMOTE CONTROL RT791/101 (silver)									
150/3		862266795101	REMOTE CONTROL RT795/101									
150/3		862266796101	REMOTE CONTROL RT796/101									
150/3		862266797101	REMOTE CONTROL RT797/101 (silver)									
			DIRECTION FOR USE									
150/15		310316622840	14PV210/01 DA, FI, NO, SV	1								
150/11		310316622830	14PV210/01 DE	1								
150/17		310316622860	14PV210/01 DE, FR, NL, IT	1								
150/18		310316622870	14PV210/01 EL	1								
150/16		310316622850	14PV210/01 IT, PT, ES	1								
150/11		310316622780	14PV210/07 EN		1							
150/11		310316622770	14PV210/39 FR			1						
150/11		310316623170	14PV210/58 EN, PL, RU, SK, CS, HU				1					

14PV325/05S	14PV325/39S	14PV327/05B	14PV327/39B	14PV340/01	14PV340/05	14PV340/39	14PV340/58	14PV345/05S	14PV345/39S	20PV220/01	20PV220/07	21PV210/75	21PV210/75S	21PV320/01	21PV320/05	21PV320/39	21PV520/58	25PV720/07	25PV720/39	37TR215/03	37TR215/39	37TVB50/39	51TR225/03	51TR225/39	51TVB60/39
				1	1	1	1																		
1	1	1	1																						
										1	1												1	1	1
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1	1	1	1	1	1	1	1	1	1																
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										2	2	2	2	2	2	2	2	4	4				2	2	2
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
										1	1	1	1	1	1	1	1	1	1				1	1	1
										1	1	1	1	1	1	1	1	1	1				1	1	1
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6	6	6	6	6	6	6	6	6	6	8	8	8	8	8	8	8	8	8	8	6	6	6	8	8	8
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Pos	⚠	Service Code	Description	14PV210/01	14PV210/07	14PV210/39	14PV210/58	14PV210/75	14PV210/75S	14PV320/01	14PV320/05	
150/11		310316624030	14PV210/75 EN, FR, ES					1				
150/11		310316624080	14PV210/75S EN, FR, ES						1			
150/11		310316623510	14PV320/01 DE							1		
150/17		310316623540	14PV320/01 DE, FR, NL, IT							1		
150/18		310316623550	14PV320/01 EL							1		
150/16		310316623530	14PV320/01 IT, PT, ES							1		
150/15		310316623520	14PV320/01DA, FI, NO, SV							1		
150/11		310316623500	14PV320/05 EN								1	
150/11		310316623610	14PV320/05B EN									
150/11		310316623620	14PV320/05S EN									
150/11		310316623560	14PV320/39 FR									1
150/15		310316623640	14PV320/39B DA, FI, NO, SV									
150/11		310316623630	14PV320/39B DE									
150/17		310316623660	14PV320/39B DE, FR, NL, IT									
150/18		310316623670	14PV320/39B FR									
150/16		310316623650	14PV320/39B IT, PT, ES									
150/15		310316623690	14PV320/39S DA, FI, NO, SV									
150/11		310316623680	14PV320/39S DE									
150/17		310316623710	14PV320/39S DE, FR, NL, IT									
150/18		310316623720	14PV320/39S FR									
150/16		310316623700	14PV320/39S IT, SK, ES									
150/15		310316623980	14PV340/01 DA, FI, NO, SV									
150/11		310316623970	14PV340/01 DE									
150/17		310316624000	14PV340/01 DE, FR, NL, IT									
150/18		310316624010	14PV340/01 EL									
150/16		310316623990	14PV340/01 IT, PT, ES									
150/11		310316623920	14PV340/05 EN									
150/11		310316624110	14PV340/05S EN									
150/11		310316623910	14PV340/39 FR									
150/15		310316624130	14PV340/39S DA, FI, NO, SV									
150/11		310316624120	14PV340/39S DE									
150/17		310316624150	14PV340/39S DE, FR, NL, IT									
150/18		310316624160	14PV340/39S FR									
150/16		310316624140	14PV340/39S IT, PT, ES									
150/11		310316624020	14PV340/58 EN, PL, SK, CS, HU									
150/15		310316623810	20PV220/01 DA, FI, NO, SV									
150/11		310316623800	20PV220/01 DE									
150/17		310316623830	20PV220/01 DE, FR, NL, IT									
150/18		310316623840	20PV220/01 EL									
150/16		310316623820	20PV220/01 IT, PT, ES									
150/11		310316623870	20PV220/07 EN									
150/11		310316624040	21PV210/75 EN, FR, ES									
150/11		310316624090	21PV210/75S EN, FR, ES									
150/15		310316623460	21PV320/01 DA, FI, NO, SV									
150/11		310316623450	21PV320/01 DE									
150/17		310316623480	21PV320/01 DE, FR, NL, IT									
150/18		310316623490	21PV320/01 EL									
150/16		310316623470	21PV320/01 IT, PT, ES									
150/11		310316623570	21PV320/05 EN									
150/11		310316623580	21PV320/39 FR									
150/11		310316623900	21PV520/58 EN, PL, RU, SK, CS, HU									
150/11		310316624100	25PV720/07 EN									
150/15		310316624180	25PV720/39 DA, FI, NO, SV									
150/11		310316624170	25PV720/39 DE									
150/17		310316624200	25PV720/39 DE, FR, NL, IT									
150/18		310316624210	25PV720/39 FR									
150/16		310316624190	25PV720/39 IT, PT, ES									
150/11		310316624070	37TR215/03 NL									
150/11		310316624060	37TR215/39 FR									

14PV325/05S	14PV325/39S	14PV327/05B	14PV327/39B	14PV340/01	14PV340/05	14PV340/39	14PV340/58	14PV345/05S	14PV345/39S	20PV220/01	20PV220/07	21PV210/75	21PV210/75S	21PV320/01	21PV320/05	21PV320/39	21PV520/58	25PV720/07	25PV720/39	37TR215/03	37TR215/39	37TVB50/39	51TR225/03	51TR225/39	51TVB60/39
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Pos	⚠	Service Code	Description	14PV210/01	14PV210/07	14PV210/39	14PV210/58	14PV210/75	14PV210/75S	14PV320/01	14PV320/05
150/11		310316624050	37TVB50/39 FR								
150/11		310316623930	51TR225/03 NL								
150/11		310316623890	51TR225/39 FR								
150/11		310316623880	51TVB60/39 FR								
			CABLES AND CABLE TREES								
8001		310314027360	FFC 7F. TD1-1965	1	1	1	1	1	1	1	1
8002		310314026880	CABLE 2F. TD2-1961	1	1	1	1	1	1	1	1
8003		482232011892	FFC 6F. TD4-1930	1	1	1	1	1	1	1	1
8004		310314027370	FFC 3F. TD3-1947	1	1	1	1	1	1	1	1
8006		310314027040	CABLE 10F. 1980-1962	1	1	1	1	1	1	1	1
8007		310314027050	CABLE 9F. 1963-1964	1	1	1	1	1	1	1	1
8008		310314027100	CABLE 10F. 1966-1913	1	1	1	1	1	1	1	1
8009		310314027260	CABLE 3F. 1969-1967 (Stereo)								
8010		310314027070	CABLE 7F. 1976-1921 (Stereo)								
8011		310314027090	CABLE 5F. 1995-1925								
8012		310314027300	CABLE 6F. 1999-1907 (20,21,25")								
8012		310314027080	CABLE 6F.1999-1907 (14")	1	1	1	1	1	1	1	1
8013		310314027250	CABLE 9F. 1905-1909								
8014		310314027190	CABLE 4F. 1984-1126 (Radio)								
8015		310314027180	CABLE 4F. 1904-1124 (Radio)								
8016	⚠	482232111462	MAINS CORD	1		1	1	1	1	1	
8016	⚠	482232111461	MAINS CORD (England version /05)		1						1
8017		310314027160	CABLE 11F. 1983-1941								
8017		310314027060	CABLE 6F. 1940-1982					1	1	1	1
8019		310314027270	CABLE 2F. 1996-Speaker Right	1	1	1	1	1	1	1	1
8020		310314027350	CABLE 2F. 1997-Speaker Left								
8021		310314027390	CABLE 4F. 1950-Deflection								
8023		310314027150	CABLE SHIELDED Tuner1-Tuner2							1	1
8024	⚠	482230350063	ANTENNA WIRE FM PIGTAL (Radio)								
			TUBES AND TUBE RELATED ITEMS								
1100	⚠	482213111184	CRT A59EAK071X11 (25" Tube)								
1100	⚠	930183400342	CRT A51EAL155X49 (21" Tube)								
1100	⚠	932213646682	CRT A48JRV90X34 (20" Tube)								
1100		932213652682	CRT A34JLL90X83(SAK) (14" Tube)	1	1	1	1	1	1	1	1
5000		310313826340	DEGAUSSING COIL 14"	1	1	1	1	1	1	1	1
5000		310313826370	DEGAUSSING COIL 20"/21"								
5000		310313826380	DEGAUSSING COIL 25"								
8000		310314027320	BRAIDED STRAP ASSY 14"	1	1	1	1	1	1	1	1
8000		310314027330	BRAIDED STRAP ASSY 20"								
8000		310314027340	BRAIDED STRAP ASSY 21,25"								
			DOCUMENTATION								
9000		310378520000	SERVICE MANUAL DE	1	1	1	1	1	1	1	1
9001		310378520010	SERVICE MANUAL EN	1	1	1	1	1	1	1	1
9002		310378520020	SERVICE MANUAL FR	1	1	1	1	1	1	1	1
9003		310378520030	SERVICE MANUAL NL	1	1	1	1	1	1	1	1
9004		310378520040	SERVICE MANUAL IT	1	1	1	1	1	1	1	1
9005		310378520050	SERVICE MANUAL ES	1	1	1	1	1	1	1	1
9010		310378520060	SERVICE DIAGRAM TVCR99/Delta	1	1	1	1	1	1	1	1
			SUB MODULES								
1003	⚠	310319883940	PCB ASSY MFSWD								
1004	⚠	310319884750	PCB ASSY DOSCD2								
1004	⚠	310319883930	PCB ASSY DOSCD1								
1005	⚠	430330834050	RADIOMODULE (TUNER ECO 5/01-2B)								
1006	⚠	310319884110	PCB ASSY KB1D								
1006	⚠	310319884120	PCB ASSY KB2DP					1	1	1	1
1006	⚠	310319884800	PCB ASSY KB2DB								
1970	⚠	310319884250	PCB ASSY SFDP1								
1970	⚠	310319884770	PCB ASSY SFDP2								

14PV325/05S	14PV325/39S	14PV327/05B	14PV327/39B	14PV340/01	14PV340/05	14PV340/39	14PV340/58	14PV345/05S	14PV345/39S	20PV220/01	20PV220/07	21PV210/75	21PV210/75S	21PV320/01	21PV320/05	21PV320/39	21PV520/58	25PV720/07	25PV720/39	37TR215/03	37TR215/39	37TVB50/39	51TR225/03	51TR225/39	51TVB60/39
																						1			
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1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
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1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
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				1	1	1	1	1	1																

TV-Board (TVBAD), CRT Board, HPAV-Board, Switch Board

MISCELLANEOUS

1001	▲	242212802786	MAINS SWITCH
1002	▲	242212802786	MAINS SWITCH
1200		992252000489	CRYSTAL 4,43MHZ
1201		482224210462	CRYSTAL 3,57MHZ
1301	▲	482226511253	FUSE HOLDER
1302	▲	482207031602	FUSE T 1,6A
1303	▲	482225251185	PROT 630mA
1304	▲	242208610919	PROT 125mA
1391	▲	482225251175	PROT 2.5A
1700		313914715330	TUNER UV1316T / AI
1701		482221010841	TUNER UV1316
1702		482224210428	FILTER EFC 5,5MHz
1702		482224270279	FILTER EFC 6MHz
1702		482224210429	FILTER EFC 6,5MHz
1703		482224270279	FILTER EFC 6MHz
1703		482224210429	FILTER EFC 6,5MHz
1704		482224272586	FILTER TPS 5,5MHz
1704		482224210322	FILTER TPS 5,5/6,0MHz
1704		482224281572	FILTER TPS 6,0MHz
1704		482224281301	FILTER TPS 6,5MHz
1705		482224281572	FILTER TPS 6,0MHz
1705		482224281301	FILTER TPS 6,5MHz
1707		482224281737	OFW G1965M
1707		482224210575	OFW J1980M
1707		482224281388	OFW G1961M
1708		482224281436	OFW K3953M
1708		482224281737	OFW G1965M
1708		482224272197	OFW K2955M
1709		482224210307	OFW G3956M
1710		482224210688	OFW K9456M
1711		482224210688	OFW K9456M
1905		482226541391	CONNECTOR 9 Pins
1931		482226520723	CONNECTOR 2 Pins
1932		482226520723	CONNECTOR 2 Pins
1933		482226710774	CONNECTOR 2 Pins RED
1934		482226520723	CONNECTOR 2 Pins
1950		242202516134	CONNECTOR 4 Pins
1955	▲	482225570293	CRT SOCKET 4454-S (14")
1958	▲	482226710922	CRT SOCKET 4446-S7(20,21,25")
1961		482232310312	CABLE ASSY AQUADAC-14"
1961	▲	310314027460	CABLE ASSY AQUADAC-20,21"
1961		482232310307	CABLE ASSY AQUADAC-25"
1962		242202510771	CONNECTOR 10 Pins
1963		482224281099	CRYSTAL 12,000MHZ
1964		242202510772	CONNECTOR 12 Pins
1966		242202510772	CONNECTOR 12 Pins
1969		482226531215	CONNECTOR 3 Pins
1978		482226511422	SCART SOCKET
1992		482226511606	CONNECTOR CINCH (Stereo)
1993		482226510481	CONNECTOR CINCH (Mono)
1995		482226710637	SOCKET 5 Pins
1996		482226531215	CONNECTOR 3 Pins
1997		482226531215	CONNECTOR 3 Pins
1998		482226731014	HEADPHONES JACK
1999		242202508149	CONNECTOR 6 Pins

CAPACITORS

2175		482212412265	4,7 µF	250V
2177		482212613694	68 pF	50V
2177		532212232531	100 pF	50V
2178		482212613694	68 pF	50V
2178		482212613695	82 pF	50V
2179		482212613695	82 pF	50V
2179		482212613694	68 pF	50V
2186		482212614153	2,2 nF	1KV
2200		482212610002	100 nF	25V
2201		482212613836	1 µF	16V
2202		482212441576	2,2 µF	50V
2203		532212232654	22 nF	50V
2204		202255205428	18 pF	50V
2205		482212614076	220 nF	25V
2207		482212233175	2,2 nF	50V
2209		202255205428	18 pF	50V
2210		482212233175	2,2 nF	50V
2211		482212613196	100 nF	16V
2212		482212441643	100 µF	16V
2213		482212233177	10 nF	50V
2214		482212233891	3,3 nF	50V
2215		482212613695	82 pF	50V
2216		482212422651	1 µF	50V
2217		482212421732	10 µF	25V
2218		482212610002	100 nF	25V
2219		482212610002	100 nF	25V
2220		482212610002	100 nF	25V
2221		482212614076	220 nF	25V
2222		532212234123	1 nF	50V
2223		532212232654	22 nF	50V
2224		532212610511	1 nF	50V
2225		532212610511	1 nF	50V
2226		532212234123	1 nF	50V
2227		532212142386	100 nF	63V
2228		482212422651	1 µF	50V
2229		532212610223	4,7 nF	50V
2230		532212234123	1 nF	50V
2231		482212613836	1 µF	16V
2232		482212233177	10 nF	50V
2233		482212440769	4,7 µF	50V
2234		482212610002	100 nF	25V
2235		482212610002	100 nF	25V
2236		482212610002	100 nF	25V
2237		532212232531	100 pF	50V
2238		532212234123	1 nF	50V
2301		482212231175	1 nF	500V
2302	▲	202233000018	470 nF	275V
2304		482212231175	1 nF	500V
2305		482212231175	1 nF	500V
2306	▲	482212614088	2,2 nF	250V
2309		482212250116	470 pF	1KV
2311		482212412439	100 µF	400V
2312		482212412415	220 µF	400V
2313		202231800108	47 nF	250V
2316		482212613337	220 pF	1KV
2317		482212250116	470 pF	1KV
2319		532212234123	1 nF	50V
2320		482212610002	100 nF	50V
2321		482212610002	100 nF	50V
2323		202002191431	22 µF	100V
2325		482212613692	47 pF	50V
2339		482212480061	1000 µF	25V
2340		482212412056	1000 µF	35V
2341		482212231177	470 pF	500V
2342		482212610002	100 nF	50V
2343		482212613196	100 nF	25V
2343		482212233177	10 nF	50V
2344		532212232331	1 nF	50V
2345		532212232268	470 pF	50V
2346		532212232268	470 pF	50V
2350		482212613337	220 pF	1KV
2351		482212412285	S2200 µF	16V
2352		202002191444	3300 µF	16V
2353		202002191496	100 µF	160V
2355		482212610002	100 nF	50V
2356		482212231211	100 pF	500V
2357		482212233175	2,2 nF	50V
2358		482212610002	100 nF	50V
2359		202002191448	220 µF	160V
2360		482212480061	1000 µF	25V
2361		532212610511	1 nF	50V
2362		532212610511	1 nF	50V
2370		482212480061	1000 µF	25V
2371		482212250116	470 pF	1KV
2372		482212421732	10 µF	25V
2373		482212610002	100 nF	50V
2374		482212421732	10 µF	25V
2383		482212141857	10 nF	250V
2385		482212421732	10 µF	25V

▲ ... Safety component, use only this type

2391	482212250116	470 pF	1KV
2393	482212441643	100 µF	16V
2400	482211610056	VDR	21V
2401	482211610056	VDR	21V
2402	482212613836	1 µF	16V
2403	532212231863	330 pF	50V
2404	482212613196	100 nF	16V
2405	532212231863	330 pF	50V
2406	482212613836	1 µF	16V
2407	482212480231	47 µF	16V
2408	482212421732	10 µF	25V
2451	482212480231	47 µF	16V
2452	482212411767	470 µF	25V
2453	482212613836	1 µF	16V
2454	482212613836	1 µF	16V
2455	482212412056	1000 µF	35V
2456	482212610002	100 nF	50V
2458	482212233177	10 nF	50V
2460	482212412056	1000 µF	35V
2461	482212412056	1000 µF	35V
2462	482212233177	10 nF	50V
2463	482212613196	100 nF	16V
2464	532212234123	1 nF	50V
2465	532212610223	4,7 nF	50V
2501	532212142578	100 nF	250V
2502	202030890151	100 nF	100V
2503	482212231175	1 nF	500V
2504	532212231863	330 pF	50V
2514	482212412266	47 µF	50V
2514	202001293595	47 µF	50V
2517	482212141857	10 nF	250V
2518	202055890485	680 pF	2KV
2519	202233300173	10 nF	1KV
2519	202233300171	8,2 nF	1,2KV
2520	202233300174	1 nF	1KV
2522	202233300169	33 nF	630V
2523	482212412265	4,7 µF	250V
2524	202233300085	390 nF	250V
2525	482212250116	470 pF	1KV
2526	202233300167	560 nF	250V
2527	482212441576	2,2 µF	50V
2528	532212142386	100 nF	50V
2529	532212234123	1 nF	50V
2530	202233300086	470 nF	250V
2531	202233300168	680 nF	250V
2535	532212142661	330 nF	50V
2537	482212440255	100 µF	50V
2539	482212480061	1000 µF	25V
2544	482212422833	10 µF	50V
2545	482212422833	10 µF	50V
2548	482212422833	10 µF	50V
2558	532212234123	1 nF	50V
2559	532212234123	1 nF	50V
2560	532212234123	1 nF	50V
2562	482212233177	10 nF	50V
2563	532212142386	100 nF	50V
2603	482212613836	1 µF	16V
2606	482212613836	1 µF	16V
2607	482212613836	1 µF	16V
2608	482212613836	1 µF	16V
2700	532212234123	1 nF	50V
2701	482212233575	220 pF	50V
2701	532212233861	120 pF	50V
2702	482212480231	47 µF	16V
2703	482212233797	47 nF	50V
2704	482212441643	100 µF	16V
2705	532212232654	22 nF	50V
2707	482212610002	100 nF	25V
2708	482212613692	47 pF	50V
2709	482212480231	47 µF	16V
2710	482212233177	10 nF	50V
2711	482212233177	10 nF	50V
2712	482212613836	1 µF	16V
2713	482212421732	10 µF	25V
2714	482212440769	4,7 µF	50V
2715	482212610002	100 nF	25V
2716	482212613836	1 µF	16V
2717	482212440769	4,7 µF	50V
2718	482212613196	100 nF	16V
2719	482212233891	3,3 nF	50V
2720	482212441576	2,2 µF	50V
2721	482212233575	220 pF	50V
2721	532212233861	120 pF	50V
2722	482212411946	22 µF	16V
2723	532212441948	0,47 µF	50V
2725	482212613482	470 nF	16V
2726	532212232448	10 pF	50V
2727	482212481151	22 µF	50V
2728	482212441576	2,2 µF	50V
2729	482212613196	100 nF	16V
2730	482212411946	22 µF	16V
2731	482212610002	100 nF	25V
2732	532212233244	8,2 pF	50V
2733	482212614076	220 nF	25V
2734	482212441576	2,2 µF	50V
2735	482212233177	10 nF	50V
2740	482212480231	47 µF	16V
2741	482212613836	1 µF	16V
2809	482212610002	100 nF	25V
2810	482212613693	56 pF	50V
2811	482212613693	56 pF	50V
2812	482212610002	100 nF	25V
2813	482212610002	100 nF	25V
2814	482212610002	100 nF	25V
2815	482212610002	100 nF	25V
2816	482212610002	100 nF	25V
2820	482212610002	100 nF	25V
2821	482212614076	220 nF	25V
2900	482212481029	100 µF	25V
2901	482212610002	100 nF	25V
2902	482212613836	1 µF	16V
2903	482212613836	1 µF	16V
2904	482212613836	1 µF	16V
2905	482212421732	10 µF	25V
2906	482212421732	10 µF	25V
2907	532212231863	330 pF	50V
2907	532212234123	1 nF	50V
2908	482212613836	1 µF	16V
2909	532212232268	470 pF	50V
2910	482212614076	220 nF	25V
2911	532212232268	470 pF	50V
2912	482212613836	1 µF	16V
2913	532212231863	330 pF	50V
2914	482212614076	220 nF	25V
2915	482212421732	10 µF	25V
2916	482212613836	1 µF	16V
2917	482212613836	1 µF	16V
2918	482212613836	1 µF	16V
2919	482212613836	1 µF	16V
2920	482212610002	100 nF	25V
2921	532212232268	470 pF	50V
2922	532212232268	470 pF	50V
2923	482212613836	1 µF	16V
2924	482212610002	100 nF	25V
2951	482212610002	100 nF	25V

RESISTORS

3169	482205120479	47 R	0,1W
3170	482211711139	1,5 K	0,1W
3170	482211711454	820 R	0,1W
3170	482205110102	1 K	0,1W
3170	482205120681	680 R	0,1W
3171	482205120472	4,7 K	0,1W
3171	482205120562	5,6 K	0,1W
3171	482211710833	10 K	0,1W
3172	482211711139	1,5 K	0,1W
3172	482211711454	820 R	0,1W
3172	482205110102	1 K	0,1W

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3173		482211710833	10 K	0,1W
3173		482205120472	4,7 K	0,1W
3173		482205120562	5,6 K	0,1W
3174		482205120681	680 R	0,1W
3174		482205120122	1,2 K	0,1W
3174		482211711454	820 R	0,1W
3174		482205110102	1 K	0,1W
3175		482205120562	5,6 K	0,1W
3175		482205120472	4,7 K	0,1W
3175		482211710833	10 K	0,1W
3176		482205120681	680 R	0,1W
3177		482205211152	1,5 K	
3179		482205211152	1,5 K	
3181		482205211152	1,5 K	
3182		319801222230	22 K	
3183		482205110102	1 K	0,1W
3183		482205120681	680 R	0,1W
3184		482205120479	47 R	0,1W
3186		482205211152	1,5 K	
3187		319801222230	22 K	
3188		482205120681	680 R	0,1W
3188		482205110102	1 K	0,1W
3193		319801222230	22 K	
3194		482205110102	1 K	0,1W
3194		482205120681	680 R	0,1W
3195		482205120479	47 R	0,1W
3199	▲	212010190373	3,3 K	FUSE
3203		482211711449	2,2 K	0,1W
3204		482211711139	1,5 K	0,1W
3205		482205120225	2,2 M	
3206		482211652272	330 K	0,16W
3207		482211652235	1 M	0,16W
3208		482205120108	1 R	
3209		482211713579	220 K	0,1W
3210		482205120105	1 M	0,1W
3211		482205120153	15 K	0,1W
3212		482205120153	15 K	0,1W
3213		482205120104	100 K	0,1W
3216		482205120101	100 R	0,1W
3217		482205120101	100 R	0,1W
3218		482205120334	330 K	0,1W
3219		482211711507	6,8 K	0,1W
3220		482205120394	390 K	0,1W
3221		482205120101	100 R	0,1W
3222		482205120681	680 R	0,1W
3223		482205120393	39 K	0,1W
3223		482205110102	1 K	0,1W
3224		482205120101	100 R	0,1W
3225		482205011002	1 K	0,16W
3226		482205120472	4,7 K	0,1W
3227		482205110102	1 K	0,1W
3228		482205120104	100 K	0,1W
3229		482211713579	220 K	0,1W
3230		482205120273	27 K	0,1W
3231		482205110102	1 K	0,1W
3232		482205110102	1 K	0,1W
3233		482211711139	1,5 K	0,1W
3234		482205110102	1 K	0,1W
3235		482205011002	1 K	0,16W
3236		482205011002	1 K	0,16W
3237		482205120332	3,3 K	0,1W
3239		482211712708	39 K	
3242		482205120153	15 K	0,1W
3243		482205120225	2,2 M	
3243		482205120106	10 M	
3244		482205120475	4,7 M	0,1W
3244		482205120684	680 K	0,1W
3245		482211710965	18 K	0,1W
3247		482205120471	470 R	0,1W
3248		482205120153	15 K	0,1W
3249		482205120681	680 R	0,1W
3250		482211710965	18 K	0,1W
3251		482211711449	2,2 K	0,1W
3252		482205120108	1 R	
3253		482211680176	1 R	0,16W

3254		482205120108	1 R	
3255		482205120108	1 R	
3256		482205120108	1 R	
3301	▲	482205321335	3,3 M	
3302		482211621227	VDR	470V
3303		482211683872	220 R	
3305		212025390255	2,2 R	
3306		212266300004	500 R	PTC
3307	▲	482205321335	3,3 M	
3308	▲	482205321335	3,3 M	
3311		319801232230	22 K	3W
3314	▲	482205211102	1 K	
3315	▲	482205211102	1 K	
3317		482205120472	4,7 K	0,1W
3318		212010892641	180 K	
3319		482205120479	47 R	0,1W
3320	▲	482205210479	47 R	
3322	▲	482205210479	47 R	FUSE
3326		319801213370	0,33 R	1W
3326		319801214770	0,47 R	1W
3327		319801213370	0,33 R	1W
3328		212010690607	1,8 R	
3330		482205120332	3,3 K	
3330		212010892621	2,7 K	
3331		482205110102	1 K	0,1W
3334	▲	482205321335	3,3 M	
3335	▲	482205211102	1 K	
3336		482205120332	3,3 K	
3339		482211652175	100 R	0,16W
3341		482205120101	100 R	0,1W
3342		482205120471	470 R	0,1W
3343		482211710834	47 K	0,1W
3344		212010892624	4,7 K	
3346		212010893869	91 K	
3347		212010893872	360 K	
3347		212010893871	240 K	
3348		482210111383	470 R	
3350		319801231010	100 R	3W
3355		482205120472	4,7 K	0,1W
3355		482211711507	6,8 K	0,1W
3356		482205120472	4,7 K	0,1W
3356		482211711507	6,8 K	0,1W
3357		482205120472	4,7 K	0,1W
3357		482211711507	6,8 K	0,1W
3358		482205120104	100 K	0,1W
3360		482211652257	22 K	0,16W
3362		482205110102	1 K	0,1W
3363		482205120223	22 K	0,1W
3370		232215621209	12 R	
3371		482211710833	10 K	0,1W
3372		482205120331	330 R	0,1W
3373		482205120471	470 R	0,1W
3375		482205120471	470 R	0,1W
3380		482211652283	4,7 K	0,16W
3383		482205120228	2,2 R	
3384		482211710833	10 K	0,1W
3385		482211711449	2,2 K	0,1W
3386		482205120471	470 R	0,1W
3392		482205110102	1 K	0,1W
3393		482205110102	1 K	0,1W
3395		212010892625	5,6 K	
3396		212010893867	5,1 K	
3397		482205110102	1 K	0,1W
3400		482211710833	10 K	0,1W
3401		482211710833	10 K	0,1W
3402		482205014709	47 R	
3403		482205014709	47 R	
3404		482205120474	470 K	0,1W
3405		482205120334	330 K	0,1W
3405		482211710834	47 K	0,1W
3406		482205110102	1 K	0,1W
3407		482205120684	680 K	0,1W
3408		482211710833	10 K	0,1W
3409		482205110102	1 K	0,1W
3410		482211710834	47 K	0,1W

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3411	482205120474	470 K	0,1W
3412	482205120684	680 K	0,1W
3413	482211710833	10 K	0,1W
3414	482205120759	75 R	0,1W
3415	482211710833	10 K	0,1W
3416	482205120108	1 R	
3416	482211710833	10 K	0,1W
3417	482205120223	22 K	0,1W
3418	482205014709	47 R	
3419	482205014709	47 R	
3420	482211711448	180 R	0,1W
3421	482211711448	180 R	0,1W
3450	482211683864	10 K	0,16W
3451	482205011002	1 K	0,16W
3452	482211683864	10 K	0,16W
3452	482211652238	12 K	0,16W
3453	482205120683	68 K	0,1W
3454	482205120104	100 K	0,1W
3455	482205120101	100 R	0,1W
3456	482211710833	10 K	0,1W
3457	482205011002	1 K	0,16W
3458	482205120101	100 R	0,1W
3460	482205120108	1 R	
3463	482205110102	1 K	0,1W
3465	482205120471	470 R	0,1W
3467	482211712955	2,7 K	0,1W
3467	482205120332	3,3 K	0,1W
3467	482205120472	4,7 K	0,1W
3468	482211652283	4,7 K	0,16W
3469	482211652283	4,7 K	0,16W
3469	482211680176	1 R	0,16W
3470	482211711139	1,5 K	0,1W
3471	482211711139	1,5 K	0,1W
3472	482211711507	6,8 K	0,1W
3473	482211652207	1,2 K	0,16W
3474	482205011002	1 K	0,16W
3502	212011290136	4,7 K	7W
3503	212010593472	5,6 K	3W
3504	482211712473	4,7 K	5W
3505	482211652256	2,2 K	0,16W
3506	482211710353	150 R	0,1W
3515	319801214790	47 R	1W
3520	482211652191	33 R	0,16W
3522 ▲	482205211102	1 K	FUSE
3523 ▲	232220733103	10 K	FUSE
3524	319801232280	2,2 R	3W
3525	482205320334	330 K	
3525	482205320224	220 K	
3526	482205120223	22 K	0,1W
3527	482205320334	330 K	
3527	482205320224	220 K	
3528	482205120683	68 K	0,1W
3529	482205011002	1 K	0,16W
3530 ▲	482205210108	1 R	
3530 ▲	482205210338	3,3 R	FUSE
3530 ▲	482205210478	4,7 R	FUSE
3531 ▲	482205210338	3,3 R	FUSE
3531 ▲	482205210108	1 R	FUSE
3531 ▲	482205210478	4,7 R	FUSE
3532 ▲	482205211828	8,2 R	FUSE
3532 ▲	482205211478	4,7 R	FUSE
3534	482211683882	39 K	0,16W
3534	482211652291	56 K	0,16W
3534	482211683884	47 K	0,16W
3535	482211652264	27 K	0,16W
3537 ▲	482205211478	4,7 R	FUSE
3538 ▲	482205211108	1 R	FUSE
3540	482205120333	33 K	0,1W
3541	482205110102	1 K	0,1W
3542	482205120683	68 K	0,1W
3543	482211710833	10 K	0,1W
3544	482211711507	6,8 K	0,1W
3545	482211652244	15 K	0,16W
3546	482205120104	100 K	0,1W
3547	482205120104	100 K	0,1W
3548	482211710834	47 K	0,1W
3549	482205120104	100 K	0,1W
3550	482211710834	47 K	0,1W
3551	482211713579	220 K	0,1W
3551	482205120474	470 K	0,1W
3552	482205120105	1 M	0,1W
3553	482205110102	1 K	0,1W
3555	482211711503	220 R	0,1W
3556	482211711503	220 R	0,1W
3557	482211710965	18 K	0,1W
3557	482211711383	12 K	0,1W
3557	482205120153	15 K	0,1W
3561	482205011002	1 K	0,16W
3561	482211652228	680 R	0,16W
3562	482211652219	330 R	0,16W
3562	482211652228	680 R	0,16W
3563	532211653564	3,3 R	
3563	482211130819	2,7 R	
3563	482211681154	2,2 R	0,16W
3563	482211680176	1 R	0,16W
3564	532211653564	3,3 R	
3564	482211130819	2,7 R	
3564	482211680176	1 R	0,16W
3565	482211683872	220 R	0,16W
3566	482211683872	220 R	0,16W
3567	482205120153	15 K	0,1W
3568	482211652283	4,7 K	0,16W
3569	482211683864	10 K	0,16W
3610	482205120104	100 K	0,1W
3613	482205120104	100 K	0,1W
3614	482205120104	100 K	0,1W
3615	482205120104	100 K	0,1W
3700	482211652175	100 R	0,16W
3701	482211652175	100 R	0,16W
3702	482211711504	270 R	0,1W
3702	482211711448	180 R	0,1W
3702	482205120108	1 R	
3703	482205120472	4,7 K	0,1W
3704	482205120122	1,2 K	0,1W
3705	482205120471	470 R	0,1W
3706	482205120471	470 R	0,1W
3707	482205120561	560 R	0,1W
3707	482205120122	1,2 K	0,1W
3708	482205120333	33 K	0,1W
3709	482205120154	150 K	0,1W
3710	482205120472	4,7 K	0,1W
3711	482205120561	560 R	0,1W
3711	482211711454	820 R	0,1W
3712	482205120681	680 R	0,1W
3713	482205110102	1 K	0,1W
3713	482205120108	1 R	
3713	482211711139	1,5 K	0,1W
3714	482211711504	270 R	0,1W
3714	482211711448	180 R	0,1W
3714	482205120331	330 R	0,1W
3715	482205120471	470 R	0,1W
3716	482211711139	1,5 K	0,1W
3717	482211711139	1,5 K	0,1W
3718	482211711448	180 R	0,1W
3719	482211652243	1,5 K	0,16W
3720	482205120391	390 R	0,1W
3723	482205120683	68 K	0,1W
3724	482205120472	4,7 K	0,1W
3725	482205120108	1 R	
3725	482205110102	1 K	0,1W
3725	482211711139	1,5 K	0,1W
3726	482205011002	1 K	0,16W
3727	482211652219	330 R	0,16W
3728	482205120472	4,7 K	0,1W
3729	482205120472	4,7 K	0,1W
3730	482205120273	27 K	0,1W
3731	482205120471	470 R	0,1W
3733	482205120101	100 R	0,1W
3735	482205120562	5,6 K	0,1W
3736	482205120331	330 R	0,1W

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3737	482211710965	18 K	0,1W
3738	482211710965	18 K	0,1W
3740	482205120472	4,7 K	0,1W
3741	482205120472	4,7 K	0,1W
3742	482205120394	390 K	0,1W
3743	482205110102	1 K	0,1W
3744	482205120681	680 R	0,1W
3745	482205120471	470 R	0,1W
3801	482211710834	47 K	0,1W
3802	482205110102	1 K	0,1W
3803	482205120472	4,7 K	0,1W
3804	482211710833	10 K	0,1W
3805	482211711449	2,2 K	0,1W
3807	482211652175	100 R	0,16W
3808	482205120472	4,7 K	0,1W
3809	482205120101	100 R	0,1W
3810	482211683864	10 K	0,16W
3814	482211652175	100 R	0,16W
3815	482205120101	100 R	0,1W
3816	482205011002	1 K	0,16W
3818	482211652175	100 R	0,16W
3819	482205120101	100 R	0,1W
3820	482211710833	10 K	0,1W
3821	482205011002	1 K	0,16W
3822	482211710834	47 K	0,1W
3823	482205120332	3,3 K	0,1W
3825	482211710834	47 K	0,1W
3826	482211710833	10 K	0,1W
3827	482211652234	100 K	0,16W
3828	482211652175	100 R	0,16W
3829	482211710834	47 K	0,1W
3831	482205011002	1 K	0,16W
3832	482211652234	100 K	0,16W
3834	482205011002	1 K	0,16W
3835	482205011002	1 K	0,16W
3836	482205120104	100 K	0,1W
3837	482211683864	10 K	0,16W
3838	482205110102	1 K	0,1W
3839	482211683883	470 R	0,16W
3841	482211652234	100 K	0,16W
3843	482211710834	47 K	0,1W
3844	482211652234	100 K	0,16W
3845	482211711139	1,5 K	0,1W
3846	482211710834	47 K	0,1W
3847	482211652175	100 R	0,16W
3849	482211711454	820 R	0,1W
3850	212010893467	24 K	
3851	212010892604	82 R	
3852	212010892604	82 R	
3853	212010892604	82 R	
3858	482211710833	10 K	0,1W
3859	482211710834	47 K	0,1W
3860	482211652234	100 K	0,16W
3861	482211683864	10 K	0,16W
3864	482211683864	10 K	0,16W
3900	482205110102	1 K	0,1W
3901	482211710833	10 K	0,1W
3902	482211711503	220 R	0,1W
3903	482205120472	4,7 K	0,1W
3904	482211711507	6,8 K	0,1W
3905	482205120759	75 R	0,1W
3906	482211683868	150 R	0,16W
3907	482211713579	220 K	0,1W
3908	482211711139	1,5 K	0,1W
3909	482211652206	120 R	0,16W
3911	482205120759	75 R	0,1W
3912	482205120472	4,7 K	0,1W
3913	482205120759	75 R	0,1W
3914	482205120822	8,2 K	0,1W
3915	482205120759	75 R	0,1W
3916	482205120759	75 R	0,1W
3917	482211711449	2,2 K	0,1W
3918	482211713579	220 K	0,1W
3919	482205120334	330 K	0,1W
3920	482205120471	470 R	0,1W
3921	482205120101	100 R	0,1W
3922	482211710833	10 K	0,1W
3922	482205110102	1 K	0,1W
3923	482211710834	47 K	0,1W
3924	482205120472	4,7 K	0,1W
3925	482205120474	470 K	0,1W
3925	482211710834	47 K	0,1W
3926	482205120684	680 K	0,1W
3927	482211710833	10 K	0,1W
3928	482205120334	330 K	0,1W
3929	482205110102	1 K	0,1W
3930	482205120101	100 R	0,1W
3931	482211710834	47 K	0,1W
3932	482205120684	680 K	0,1W
3933	482205120472	4,7 K	0,1W
3934	482211710834	47 K	0,1W
3935	482205120108	1 R	
3936	482205120104	100 K	0,1W
3937	482205120104	100 K	0,1W
3938	482205120104	100 K	0,1W
3939	482205120472	4,7 K	0,1W
3940	482205120334	330 K	0,1W
3941	482205120684	680 K	0,1W
3942	482211711448	180 R	0,1W
3943	482211711448	180 R	0,1W
3945	482205120331	330 R	0,1W
3946	482211711504	270 R	0,1W
3947 ▲	482205210478	4,7 R	FUSE
3951	482211711503	220 R	0,1W
3952	482211711503	220 R	0,1W

CHIP JUMPER

4195	482205120008	CHIP JUMPER
4196	482205120008	CHIP JUMPER
4197	482205120008	CHIP JUMPER
4200	482205120008	CHIP JUMPER
4201	482205120008	CHIP JUMPER
4202	482205120008	CHIP JUMPER
4228	482205120008	CHIP JUMPER
4229	482205120008	CHIP JUMPER
4230	482205120008	CHIP JUMPER
4240	482205120008	CHIP JUMPER
4241	482205120008	CHIP JUMPER
4242	482205120008	CHIP JUMPER
4321	482205120008	CHIP JUMPER
4359	482205120008	CHIP JUMPER
4402	482205120008	CHIP JUMPER
4410	482205120008	CHIP JUMPER
4444	482205120008	CHIP JUMPER
4450	482205120008	CHIP JUMPER
4451	482205120008	CHIP JUMPER
4452	482205120008	CHIP JUMPER
4453	482205120008	CHIP JUMPER
4454	482205120008	CHIP JUMPER
4455	482205120008	CHIP JUMPER
4457	482205120008	CHIP JUMPER
4556	482205120008	CHIP JUMPER
4600	482205120008	CHIP JUMPER
4601	482205120008	CHIP JUMPER
4621	482205120008	CHIP JUMPER
4622	482205120008	CHIP JUMPER
4700	482205120008	CHIP JUMPER
4701	482205120008	CHIP JUMPER
4702	482205120008	CHIP JUMPER
4704	482205120008	CHIP JUMPER
4707	482205120008	CHIP JUMPER
4711	482205120008	CHIP JUMPER
4723	482205120008	CHIP JUMPER
4724	482205120008	CHIP JUMPER
4726	482205120008	CHIP JUMPER
4727	482205120008	CHIP JUMPER
4728	482205120008	CHIP JUMPER
4800	482205120008	CHIP JUMPER

▲ ... Safety component, use only this type

4801	482205120008	CHIP JUMPER
4802	482205120008	CHIP JUMPER
4803	482205120008	CHIP JUMPER
4821	482205120008	CHIP JUMPER
4822	482205120008	CHIP JUMPER
4823	482205120008	CHIP JUMPER
4824	482205120008	CHIP JUMPER
4825	482205120008	CHIP JUMPER
4901	482205120008	CHIP JUMPER
4902	482205120008	CHIP JUMPER
4906	482205120008	CHIP JUMPER
4907	482205120008	CHIP JUMPER
4912	482205120008	CHIP JUMPER
4920	482205120008	CHIP JUMPER
4922	482205120008	CHIP JUMPER
4923	482205120008	CHIP JUMPER
4924	482205120008	CHIP JUMPER
4929	482205120008	CHIP JUMPER
4935	482205120008	CHIP JUMPER
4939	482205120008	CHIP JUMPER
4956	482205120008	CHIP JUMPER
4957	482205120008	CHIP JUMPER

COILS

5190	482215771519	47µH
5190	482215771736	10µH
5200	482215771206	COIL BLM21
5201	482215771206	COIL BLM21
5202	482215771206	COIL BLM21
5203	482215771206	COIL BLM21
5204	482215771206	COIL BLM21
5205	482215771206	COIL BLM21
5301 ▲	482215711138	29mF
5302	242253594637	4,7µH
5303	242253594637	4,7µH
5304	482215711737	22µH
5305	482215711737	22µH
5312	482252610704	BEAD 100MHz
5313	482252610704	BEAD 100MHz
5330	820310791470	MAINS TRANSF. 14,20,21"
5330 ▲	820310791380	MAINS TRANSF. 25"
5340	482215771736	10µH
5350	482252610704	BEAD 100MHz
5351	482252610704	BEAD 100MHz
5360	482215771736	10µH
5370	482215751462	10µH
5380	482252610704	BEAD 100MHz
5500	482214621116	LINE DRIVER TRAFO 14,20,21"
5501	482214240353	LINE DRIVER TRAFO 25"
5502	482215771519	47µH
5518	482215711213	22µH
5518	482215771519	47µH
5519 ▲	312813820890	LINE TRANSFORMER 14,20,21"
5520 ▲	242253102341	LINE TRANSFORMER 25"
5522	482215650108	LINEARITY CORR.COIL
5525	482214010509	BRIDGE COIL
5526	482215810728	ENS TRANSFO
5700	482215711231	1µH
5701	482215770877	0,256µH
5703	482215711525	6,8µH
5704	482215710972	15µH
5704	482215711706	10µH
5705	482215711525	6,8µH
5706	482215711525	6,8µH
5707	482215770877	0,256µH
5708	482215711525	6,8µH
5712	482215710972	15µH
5801	482215771206	COIL BLM21
5802	482215771206	COIL BLM21
5803	482215771206	COIL BLM21

DIODES

6175	482213034382	BZX79-C8V2
6176	482213030842	BAV21
6178	482213030842	BAV21
6180	482213030842	BAV21
6183	482213083757	BAS216
6184	482213083757	BAS216
6185	482213083757	BAS216
6190	482213034142	BZX79-C33
6191	482213034142	BZX79-C33
6200	482213083757	BAS216
6201	482213030621	1N4148
6202	482213030621	1N4148
6203	482213083757	BAS216
6205	482213083757	BAS216
6220	482213083757	BAS216
6221	482213030842	BAV21
6234	482213031983	BAT85
6235	482213031983	BAT85
6236	482213031983	BAT85
6301	482213031083	1N5062
6302	482213031083	1N5062
6303	482213031083	1N5062
6304	482213031083	1N5062
6314	932212671673	BYT42M
6322	933428540673	BAV21
6325	482213031878	1N4003
6326	482213031878	1N4003
6340	482213011584	BYW98-200C1
6341	482213061219	BZX79-C10
6341	482213034197	BZX79-C12
6342	482213010871	SBYV27-200
6350	482213041602	BYW 95C/20
6351	932212671673	BYT42M
6355	933851840133	BZX79-F33
6356	932212671673	BYT42M
6357	482213083757	BAS216
6358	482213020294	THYRISTOR X0203MA
6370	932212671673	BYT42M
6372	933414680133	BZX79-C2V4
6373	532213031504	BZX79-F3V3
6374	482213083757	BAS216
6376	482213030842	BAV21
6377	482213030842	BAV21
6378	482213030842	BAV21
6381	482213030842	BAV21
6382	482213034278	BZX79-C6V8
6385	482213034173	BZX79-F5V6
6387	482213010654	BAT254
6390	932212868682	SB360
6391	482213011584	BYW98-200C1
6392	482213061219	BZX79-C10
6402	482213034278	BZX79-C6V8
6403	482213034278	BZX79-C6V8
6404	482213034278	BZX79-C6V8
6405	482213034278	BZX79-C6V8
6406	482213034278	BZX79-C6V8
6407	482213034278	BZX79-C6V8
6450	482213083757	BAS216
6451	482213083757	BAS216
6520	482213032896	BYD33M A
6521	933621580112	BY228/20
6522	482213041602	BYW 95C/20
6523	482213042488	BYD33D
6524	482213042488	BYD33D
6526	482213034278	BZX79-C6V8
6528	482213034142	BZX79-C33
6532	482213042606	BYD33J
6537	482213042488	BYD33D
6538	482213042488	BYD33D
6540	482213030842	BAV21
6541	482213034441	BZX79-C22
6542	482213034441	BZX79-C22
6543	482213034379	BZX79-C27

▲ ... Safety component, use only this type

6544	482213030842	BAV21
6545	482213034278	BZX79-C6V8
6547	482213030842	BAV21
6548	482213083757	BAS216
6549	482213034441	BZX79-C22
6550	482213034142	BZX79-C33
6551	482213083757	BAS216
6568	482213034441	BZX79-C22
6700	482213010414	BA792
6701	482213010414	BA792
6702	482213010414	BA792
6705	482213010414	BA792
6706	482213010414	BA792
6707	482213010414	BA792
6900	482213034197	BZX79-C12
6901	482213034197	BZX79-C12
6902	482213034197	BZX79-C12
6903	482213034197	BZX79-C12
6904	482213034197	BZX79-C12
6905	482213034197	BZX79-C12
6906	482213034197	BZX79-C12
6907	482213030621	1N4148
6908	482213030621	1N4148
6909	482213034197	BZX79-C12
6910	482213034197	BZX79-C12
6911	482213034197	BZX79-C12
6912	482213034197	BZX79-C12
6913	482213030621	1N4148

TRANSISTORS & IC's

7180	933259350126	BF422
7181	933259350126	BF422
7182	933259350126	BF422
7183	933259350126	BF422
7184	933259350126	BF422
7185	933259350126	BF422
7186	933259360126	BF423
7187	933259360126	BF423
7188	933259360126	BF423
7201	532213060508	BC857B
7204	482220973852	PMBT2369
7205	935262021112	TDA8840/N2/S1
7205	935262022112	TDA8841/N2/S1
7205	482220916775	TDA8842/N2/S1
7205	482220917221	TDA8844/N2/S1
7206	482213060511	BC847B
7208	482220973852	PMBT2369
7209	532213060508	BC857B
7210	532213060508	BC857B
7211	532213060508	BC857B
7212	482220960792	74HC4053D
7215	482220973852	PMBT2369
7219	482213060511	BC847B
7300	932213693687	FET POW 2SK2750
7310	932213656682	MC44608P75
7340 ▲	932212719682	OPT CP TCET1101G
7341	482220981397	TL431CZ-AP
7355	933259350126	BF422
7358	482213060511	BC847B
7370	933650090126	BC557C
7371	482213060511	BC847B
7375	482220933665	L78M08CV
7381	933650090126	BC557C
7382	482213060511	BC847B
7391	482213060838	2SK2232
7392	482220981397	TL431CZ-AP
7393	532213060508	BC857B
7400	482213060511	BC847B
7401	482213060511	BC847B
7450	932212839667	TDA7495
7450	932212840667	TDA7494
7451	482213060511	BC847B
7452	532213060508	BC857B
7501	482213041752	MPSA43
7520	482213063569	BU1508DX
7521	482213011575	BUT11APX L
7543	482213060511	BC847B
7547	532213060508	BC857B
7555	935262202112	TDA8356/N6
7556	935262194112	TDA8350Q/N6
7651	532220911102	HEF4052BT
7701	933372960653	HEF4053BT
7702	482213060511	BC847B
7704	532213060508	BC857B
7705	482220931555	TDA9830/V1
7706	482213060511	BC847B
7709	482213063732	PDTC124ET
7710	482213063732	PDTC124ET
7711	482213060511	BC847B
7712	482213063732	PDTC124ET
7713	482213063732	PDTC124ET
7714	482213063732	PDTC124ET
7715	482213063732	PDTC124ET
7716	482213063732	PDTC124ET
7720	935260611118	TDA9818T/V1
7800	482220973852	PMBT2369
7801	482220916908	M24C01-MN6
7802	482213063732	PDTC124ET
7803	482213063732	PDTC124ET
7804	935263640112	SAA5562PS
7806	482213040959	TRANS BC547B
7807	482213063732	PDTC124ET
7808	482213063732	PDTC124ET
7900	532213060508	BC857B
7901	482213060511	BC847B
7902	482213060511	BC847B
7903	532213060508	BC857B
7904	532220911102	HEF4052BT
7905	532213060508	BC857B
7906	532213042755	BC847C
7907	532213042755	BC847C
7908	482213060511	BC847B
7909	532213042755	BC847C

▲ ... Safety component, use only this type

Recorder Unit Board (RUBAD)

MISCELLANEOUS

0007	482225610195	TACHO HOLDER
0008	482225610196	TACHO HOLDER
0020	310315012050	SENSORHOLDER
0021	482225610197	SENSOR HOLDER DECK
0022	310315012050	SENSOR HOLDER
0030	482225610198	DISTANCE HOLDER
0031	482225610198	DISTANCE HOLDER
0032	482225610359	DISTANCE HOLDER MOBO
0033	482225610359	DISTANCE HOLDER MOBO
0034	482225610359	DISTANCE HOLDER MOBO
0040	482225541366	LED-SOCKET
0041	482225541366	LED-SOCKET
0042	482225541366	LED-SOCKET
0043	310315012060	IR-HOLDER
1000	482224210695	CRYSTAL 4,43MHZ
1151 ▲	482225251187	FUSE 500mA
1152 ▲	482225251187	FUSE 500mA
1153 ▲	482225251187	FUSE 500mA
1300	482224281436	OFW K3953M
1301	482221010773	TUNER UV1316
1302	482224210307	OFW G3956M
1302	482224210575	OFW J1980M
1302	482224281388	OFW G1961M
1302	482224272197	OFW K2955M
1304	482224272586	FILTER TPS 5,5MHz
1304	482224281572	FILTER TPS 6,0MHz
1304	482224281301	FILTER TPS 6,5MHz
1305	482224210688	OFW K9456M
1305	482224210306	OFW K9463M
1306	482224210428	FILTER EFC 5,5MHz
1306	482224270279	FILTER EFC 6MHz
1306	482224210429	FILTER EFC 6,5MHz
1307	482224270279	FILTER EFC 6MHz
1307	482224210429	FILTER EFC 6,5MHz
1670	482224210434	CRYSTAL 18,43MHz
1801	482227711521	SWITCH ASSY
1803	482227711521	SWITCH ASSY
1900	482227613732	SWITCH BUTTON
1901	482227613732	SWITCH BUTTON
1902	482227613732	SWITCH BUTTON
1903	482227613732	SWITCH BUTTON
1904	482227613732	SWITCH BUTTON
1905	482227613732	SWITCH BUTTON
1906	482227613732	SWITCH BUTTON
1907	242202508149	CONNECTOR 6 Pins
1908	482227613732	SWITCH BUTTON
1909	482227613732	SWITCH BUTTON
1910	482227613732	SWITCH BUTTON
1911	482226710364	CONNECTOR 9 Pins
1912	482226741199	CONNECTOR 5 Pins
1913	242202510772	CON BM V 12P M 2.00 PH B
1931	482224210956	CRYSTAL 20MHz
1946	482226710366	CAPSTAN-CONNECT.
1947	482226710957	CONNECTOR 3 Pins
1948	482226741062	CONNECTOR 6 Pins
1961	532226890415	CONNECTOR 2 Pins
1963	242202510772	CONNECTOR 12 Pins
1965	482226710953	CONNECTOR 7 Pins
1967	482226531215	CONNECTOR 3 Pins
1970	482224270938	CRYSTAL 32,768KHz
1980	242202510771	CONNECTOR 10 Pins
1981	482226710958	CONNECTOR 5 Pins
1982	242202508149	CONNECTOR 6 Pins
1983	242202510655	CONNECTOR 11 Pins
1984	242202509406	CONNECTOR 4 Pins

CAPACITORS

2000	482212610002	100 nF	25V
2001	482212613836	1 µF	16V
2002	482212233177	10 nF	50V
2003	482212233177	10 nF	50V
2004	482212233177	10 nF	50V
2005	482212610002	100 nF	25V
2006	482212412052	220 µF	6,3V
2008	482212613836	1 µF	16V
2009	482212613836	1 µF	16V
2010	482212233177	10 nF	50V
2011	482212233177	10 nF	50V
2012	482212422651	1 µF	50V
2013	482212233177	10 nF	50V
2014	482212610002	100 nF	25V
2015	482212613751	47 nF	25V
2016	532212232654	22 nF	50V
2017	482212610002	100 nF	25V
2018	482212233177	10 nF	50V
2019	532212231873	2,7 pF	50V
2020	482212613196	100 nF	16V
2021	482212422651	1 µF	50V
2022	482212421732	10 µF	25V
2023	482212480854	1 µF	50V
2024	482212480231	47 µF	16V
2025	482212233177	10 nF	50V
2026	482212610002	100 nF	25V
2027	482212421732	10 µF	25V
2028	482212613196	100 nF	16V
2029	482212610002	100 nF	25V
2030	482212411946	22 µF	16V
2031	482212233177	10 nF	50V
2032	482212613196	100 nF	16V
2033	482212613196	100 nF	16V
2034	482212422651	1 µF	50V
2035	482212440769	4,7 µF	50V
2036	482212610002	100 nF	25V
2037	482212613836	1 µF	16V
2041	482212411946	22 µF	16V
2042	482212233177	10 nF	50V
2043	482212233177	10 nF	50V
2044	532212232658	22 pF	50V
2045	482212613222	390 pF	50V
2046	482212614124	220 pF	50V
2048	482212233177	10 nF	50V
2050	482212613196	100 nF	16V
2051	482212412052	220 µF	6,3V
2052	482212613695	82 pF	50V
2053	482212610002	100 nF	25V
2054	532212232966	39 pF	50V
2055	482212610002	100 nF	25V
2056	532212232658	22 pF	50V
2057	482212422726	100 µF	16V
2058	482212233177	10 nF	50V
2059	482212233177	10 nF	50V
2060	482212613691	27 pF	50V
2061	482212233575	220 pF	50V
2062	482212480483	47 µF	6,3V
2070	482212233177	10 nF	50V
2071	532212233538	150 pF	50V
2072	482212233177	10 nF	50V
2073	482212610002	100 nF	25V
2074	482212614124	220 pF	50V
2075	482212613196	100 nF	16V
2076	482212613695	82 pF	50V
2077	482212233177	10 nF	50V
2078	482212613196	100 nF	16V
2079	482212422726	100 µF	16V
2080	532212232531	100 pF	50V
2082	482212233177	10 nF	50V
2083	482212233177	10 nF	50V
2084	482212233177	10 nF	50V
2085	482212421732	10 µF	25V
2086	482212613482	470 nF	16V
2087	532212610184	680 pF	50V
2088	482212613836	1 µF	16V
2089	532212232654	22 nF	50V
2090	482212233575	220 pF	50V
2091	532212232531	100 pF	50V
2092	482212233177	10 nF	50V

▲ ... Safety component, use only this type

Recorder Unit Board (RUBAD)

2100	482212233177	10 nF	50V
2101	532212232268	470 pF	50V
2102	482212233177	10 nF	50V
2103	482212233177	10 nF	50V
2104	482212614076	220 nF	25V
2105	482212422726	100 µF	16V
2106	532212232531	100 pF	50V
2107	532212232654	22 nF	50V
2108	532212232659	33 pF	50V
2109	482212233177	10 nF	50V
2110	482212233177	10 nF	50V
2111	482212233177	10 nF	50V
2112	482212233177	10 nF	50V
2113	482212233177	10 nF	50V
2114	482212233177	10 nF	50V
2115	482212233177	10 nF	50V
2116	482212233177	10 nF	50V
2117	482212233177	10 nF	50V
2118	482212233177	10 nF	50V
2150	482212480231	47 µF	16V
2154	482212421732	10 µF	25V
2160	202001293691	220 µF	16V
2161	482212422726	100 µF	16V
2305	482212421732	10 µF	25V
2306	482212480231	47 µF	16V
2307	482212233177	10 nF	50V
2308	482212421732	10 µF	25V
2309	532212441379	2,2 µF	50V
2310	532212232268	470 pF	50V
2311	482212610002	100 nF	25V
2312	482212614076	220 nF	25V
2313	482212610002	100 nF	25V
2314	482212614319	8,2 pF	50V
2315	482212610002	100 nF	25V
2316	482212233575	220 pF	50V
2317	532212233861	120 pF	50V
2318	482212233797	47 nF	50V
2319	532212234123	1 nF	50V
2320	482212422652	2,2 µF	50V
2321	482212480483	47 µF	6,3V
2322	532212232654	22 nF	50V
2323	482212411946	22 µF	16V
2324	482212233177	10 nF	50V
2325	482212481151	22 µF	50V
2461	532212610223	4,7 nF	50V
2462	482212480791	470 µF	16V
2463	482212233177	10 nF	50V
2471	482212480231	47 µF	16V
2472	482212422726	100 µF	16V
2473	532212610223	4,7 nF	50V
2474	482212233175	2,2 nF	50V
2475	482212480231	47 µF	16V
2476	482212612105	33 nF	50V
2477	482212610002	100 nF	25V
2478	482212233177	10 nF	50V
2479	482212233177	10 nF	50V
2480	482212422726	100 µF	16V
2482	482212610002	100 nF	25V
2483	532212232654	22 nF	50V
2484	482212480854	1 µF	50V
2485	482212480854	1 µF	50V
2486	482212480854	1 µF	50V
2487	482212610002	100 nF	25V
2489	482212422263	220 µF	25V
2490	482212610002	100 nF	25V
2491	532212232531	100 pF	50V
2492	532212232654	22 nF	50V
2493	482212233177	10 nF	50V
2494	482212610002	100 nF	25V
2495	482212233797	47 nF	50V
2496	532212232654	22 nF	50V
2497	482212233177	10 nF	50V
2501	482212480231	47 µF	16V
2600	482212610002	100 nF	25V
2601	482212411946	22 µF	16V
2602	482212480231	47 µF	16V
2603	482212421732	10 µF	25V
2604	482212612105	33 nF	50V
2605	482212233797	47 nF	50V
2606	482212612105	33 nF	50V
2607	482212612105	33 nF	50V
2608	482212613836	1 µF	16V
2609	482212610002	100 nF	25V
2610	482212480231	47 µF	16V
2611	482212613836	1 µF	16V
2612	482212610002	100 nF	25V
2613	482212233177	10 nF	50V
2614	482212480231	47 µF	16V
2615	482212421732	10 µF	25V
2616	482212233175	2,2 nF	50V
2617	482212613836	1 µF	16V
2618	482212610002	100 nF	25V
2619	482212614127	39 nF	50V
2620	482212233177	10 nF	50V
2621	532212232268	470 pF	50V
2622	482212613188	15 nF	50V
2624	532212610511	1 nF	50V
2625	532212610511	1 nF	50V
2626	482212480231	47 µF	16V
2627	532212610511	1 nF	50V
2628	482212421732	10 µF	25V
2629	482212613751	47 nF	25V
2630	482212143873	27 nF	50V
2631	482212610002	100 nF	25V
2632	482212610002	100 nF	25V
2633	482212422726	100 µF	16V
2634	482212422726	100 µF	16V
2636	532212610223	4,7 nF	50V
2637	482212233177	10 nF	50V
2640	482212480231	47 µF	16V
2641	482212610002	100 nF	25V
2642	482212422726	100 µF	16V
2643	532212232654	22 nF	50V
2644	482212422652	2,2 µF	50V
2646	482212613196	100 nF	16V
2647	482212480231	47 µF	16V
2648	482212421732	10 µF	25V
2649	532212231866	6,8 nF	50V
2650	482212421732	10 µF	25V
2651	482212480231	47 µF	16V
2652	482212421732	10 µF	25V
2653	532212231866	6,8 nF	50V
2654	482212421732	10 µF	25V
2655	482212422652	2,2 µF	50V
2656	482212422652	2,2 µF	50V
2658	482212614076	220 nF	25V
2659	482212614076	220 nF	25V
2660	482212614076	220 nF	25V
2661	482212614076	220 nF	25V
2662	482212614076	220 nF	25V
2663	482212614076	220 nF	25V
2664	482212614076	220 nF	25V
2666	482212233177	10 nF	50V
2667	482212610002	100 nF	25V
2670	482212421732	10 µF	25V
2671	482212233177	10 nF	50V
2673	482212421732	10 µF	25V
2674	482212610002	100 nF	25V
2675	482212233177	10 nF	50V
2676	482212421732	10 µF	25V
2677	482212233177	10 nF	50V
2678	482212421732	10 µF	25V
2679	482212233177	10 nF	50V
2680	482212440769	4,7 µF	50V
2681	532212232286	3,3 pF	50V
2682	532212232286	3,3 pF	50V
2683	482212233177	10 nF	50V
2685	482212421732	10 µF	25V
2690	532212234123	1 nF	50V
2691	482212422651	1 µF	50V

Recorder Unit Board (RUBAD)

2692	482212613693	56 pF	50V
2693	482212613693	56 pF	50V
2800	482212422263	220 µF	25V
2802	482212610002	100 nF	25V
2805	482212480231	47 µF	16V
2808	482212233575	220 pF	50V
2900	482212233177	10 nF	50V
2902	482212411946	22 µF	16V
2903	482212613836	1 µF	16V
2904	482212613691	27 pF	50V
2905	482212610002	100 nF	25V
2906	482212613691	27 pF	50V
2907	532212232659	33 pF	50V
2908	482212613196	100 nF	16V
2909	482212233177	10 nF	50V
2910	482212480231	47 µF	16V
2960	482212613482	470 nF	16V
2961	482212610002	100 nF	25V
2962	482212610002	100 nF	25V
2963	482212612105	33 nF	50V
2964	482212233175	2,2 nF	50V
2970	482212440181	1000 µF	6,3V
2971	482212411968	220 mF	5,5V
2972	482212613691	27 pF	50V
2973	482212233177	10 nF	50V
2975	482212233177	10 nF	50V
2991	482212233172	390 pF	50V
2993	482212233172	390 pF	50V
2994	482212440181	1000 µF	6,3V
2995	202001292782	10 µF	16V

RESISTORS

3002	482205120182	1,8 K	0,1W
3003	482211711449	2,2 K	0,1W
3008	482205120822	8,2 K	0,1W
3009	482205011002	1 K	0,16W
3010	482205120562	5,6 K	0,1W
3011	482211710834	47 K	0,1W
3012	482205120105	1 M	0,1W
3013	482211652175	100 R	0,16W
3014	482205011002	1 K	0,16W
3016	482211683884	47 K	0,16W
3017	482211683882	39 K	0,16W
3018	212010892619	2,2 K	
3019	482211711504	270 R	0,1W
3020	482211710833	10 K	0,1W
3020	482205120153	15 K	0,1W
3021	482205120334	330 K	0,1W
3022	212010892614	680 R	
3023	212010893465	1,3 K	
3025	482205120471	470 R	0,1W
3026	482211652175	100 R	0,16W
3027	212010892624	4,7 K	
3028	482205120471	470 R	0,1W
3029	482211652175	100 R	0,16W
3030	482211652228	680 R	0,16W
3031	482205110102	1 K	0,1W
3032	482211711449	2,2 K	0,1W
3033	482211652228	680 R	0,16W
3034	482211711449	2,2 K	0,1W
3035	482205120681	680 R	0,1W
3036	482211711449	2,2 K	0,1W
3037	482211683883	470 R	0,16W
3038	482211711449	2,2 K	0,1W
3039	482205011002	1 K	0,16W
3040	482205120479	47 R	0,1W
3041	482211652175	100 R	0,16W
3070	482211683884	47 K	0,16W
3071	482211711139	1,5 K	0,1W
3072	482205120822	8,2 K	0,1W
3073	482211710833	10 K	0,1W
3074	482211683933	15 K	
3075	482205120101	100 R	0,1W
3076	482211710965	18 K	0,1W
3077	482205110102	1 K	0,1W
3078	482205120122	1,2 K	0,1W
3079	482205011002	1 K	0,16W
3080	482211711449	2,2 K	0,1W
3081	482211683884	47 K	0,16W
3082	482211710833	10 K	0,1W
3083	482205011002	1 K	0,16W
3084	482205120223	22 K	0,1W
3085	482211710833	10 K	0,1W
3086	482210012158	22 K	
3087	482205120273	27 K	0,1W
3088	482211712955	2,7 K	0,1W
3089	482210130874	1 K	
3090	482205120392	3,9 K	0,1W
3091	482205120822	8,2 K	0,1W
3092	482211711139	1,5 K	0,1W
3093	482211711383	12 K	0,1W
3094	482205120104	100 K	0,1W
3095	482205120333	33 K	0,1W
3096	482211652276	3,9 K	0,16W
3100	482205120562	5,6 K	0,1W
3101	482205120472	4,7 K	0,1W
3102	482205120681	680 R	0,1W
3103	482211683933	15 K	
3105	482205110102	1 K	0,1W
3106	482205022202	2,2 K	
3107	482205120331	330 R	0,1W
3108	482211710833	10 K	0,1W
3109	482211713579	220 K	0,1W
3110	482211712342	18 K	
3110	212010892629	22 K	
3110	482211712024	27 K	
3111	482205120331	330 R	0,1W
3112	482211652175	100 R	0,16W
3150	482211652176	10 R	0,16W
3151	482211652176	10 R	0,16W
3152	482205120122	1,2 K	0,1W
3153	482211711503	220 R	0,1W
3154	482211712955	2,7 K	0,1W
3155	482205120471	470 R	0,1W
3156	482205120101	100 R	0,1W
3157	482205120561	560 R	0,1W
3158	482211711383	12 K	0,1W
3159	482205120101	100 R	0,1W
3161	482211710833	10 K	0,1W
3162	482211710833	10 K	0,1W
3163	482211683864	10 K	0,16W
3164	482211652195	47 R	0,16W
3166	482211683884	47 K	0,16W
3300	482211652228	680 R	0,16W
3301	482211652219	330 R	0,16W
3302	482211652289	5,6 K	0,16W
3303	482205120333	33 K	0,1W
3304	482205120154	150 K	0,1W
3305	482211710965	18 K	0,1W
3306	482205120472	4,7 K	0,1W
3307	482210012158	22 K	
3308	482205120101	100 R	0,1W
3309	482211710965	18 K	0,1W
3310	482205120471	470 R	0,1W
3311	482205120332	3,3 K	0,1W
3312	482205120471	470 R	0,1W
3313	482211711503	220 R	0,1W
3314	482211711504	270 R	0,1W
3314	482205120331	330 R	0,1W
3315	482205110102	1 K	0,1W
3316	482205120472	4,7 K	0,1W
3318	482205120332	3,3 K	0,1W
3319	482205120101	100 R	0,1W
3320	482205120101	100 R	0,1W
3321	482205120472	4,7 K	0,1W
3322	482205120472	4,7 K	0,1W
3323	482211652263	2,7 K	0,16W
3325	482205120472	4,7 K	0,1W

Recorder Unit Board (RUBAD)

3450 ⚠	482205210228	2,2 R	
3451	482205120223	22 K	0,1W
3452	482205120471	470 R	0,1W
3453	482211683872	220 R	0,16W
3454	482211652283	4,7 K	0,16W
3455	482211680176	1 R	0,16W
3456	482211710834	47 K	0,1W
3457	482205120392	3,9 K	0,1W
3458	482211652283	4,7 K	0,16W
3459	482211652283	4,7 K	0,16W
3460	482211683881	390 R	0,16W
3461	482211683864	10 K	0,16W
3462	482211652264	27 K	0,16W
3463	482211652257	22 K	0,16W
3464	482211711149	82 K	0,1W
3465	482211652244	15 K	0,16W
3466	482211683883	470 R	0,16W
3467	482205120225	2,2 M	
3468	482205120104	100 K	0,1W
3469	482205120104	100 K	0,1W
3470	482211652283	4,7 K	0,16W
3471	482205120101	100 R	0,1W
3472	482205120101	100 R	0,1W
3473	482211652175	100 R	0,16W
3474	482205120391	390 R	0,1W
3475	482205120273	27 K	0,1W
3476	482211652283	4,7 K	0,16W
3477	482205110102	1 K	0,1W
3501	482211711139	1,5 K	0,1W
3502	482205120182	1,8 K	0,1W
3503	482211711139	1,5 K	0,1W
3504	482205120101	100 R	0,1W
3505	482205120479	47 R	0,1W
3506	482205120223	22 K	0,1W
3507	482205120479	47 R	0,1W
3508	482205120471	470 R	0,1W
3509	482205120153	15 K	0,1W
3510	482205120471	470 R	0,1W
3511	482211652175	100 R	0,16W
3600	482211683884	47 K	0,16W
3601	482205120225	2,2 M	
3602	482205120822	8,2 K	0,1W
3603	482211652175	100 R	0,16W
3604	482211652175	100 R	0,16W
3606	482205120822	8,2 K	0,1W
3607	482211683883	470 R	0,16W
3608	482211652256	2,2 K	0,16W
3609	482211652289	5,6 K	0,16W
3610	482205120153	15 K	0,1W
3610	482211711383	12 K	0,1W
3611	482205120223	22 K	0,1W
3612	482211710833	10 K	0,1W
3613	482211652269	3,3 K	0,16W
3614	482211652191	33 R	0,16W
3615	482211711507	6,8 K	0,1W
3616	482205120153	15 K	0,1W
3616	482211710965	18 K	0,1W
3617	482205120223	22 K	0,1W
3618	482205120472	4,7 K	0,1W
3619	482205120822	8,2 K	0,1W
3620	482205120475	4,7 M	0,1W
3621	482211652228	680 R	0,16W
3622	482211683884	47 K	0,16W
3623	482211652257	22 K	0,16W
3624	482205120822	8,2 K	0,1W
3625	482211652256	2,2 K	0,16W
3626	482211711383	12 K	0,1W
3627	482211652251	18 K	0,16W
3628	482211711449	2,2 K	0,1W
3629	482211652195	47 R	0,16W
3630	482210012159	100 K	
3631	482211711952	390 K	
3632	482211711449	2,2 K	0,1W
3633	482211710834	47 K	0,1W
3634	482205120101	100 R	0,1W
3634	482205120681	680 R	0,1W
3635	482205120109	10 R	0,1W
3636	482205120391	390 R	0,1W
3637	482205120158	1,5 R	
3638	482210012157	10 K	
3639	482211711383	12 K	0,1W
3640	482211711383	12 K	0,1W
3642	482211710834	47 K	0,1W
3643	482211710834	47 K	0,1W
3644	482205120561	560 R	0,1W
3645	482205120229	22 R	0,1W
3651	482211652303	8,2 K	0,16W
3653	482211712708	39 K	
3654	482205011002	1 K	0,16W
3655	482211652175	100 R	0,16W
3656	482211652175	100 R	0,16W
3657	482211712955	2,7 K	0,1W
3658	482205120333	33 K	0,1W
3659	482211712955	2,7 K	0,1W
3660	482205120333	33 K	0,1W
3661	482211683883	470 R	0,16W
3664	482211683864	10 K	0,16W
3670	482211683864	10 K	0,16W
3671	482211683884	47 K	0,16W
3672	482211652175	100 R	0,16W
3673	482211652175	100 R	0,16W
3674	482211652175	100 R	0,16W
3675	482211652175	100 R	0,16W
3800	482211683864	10 K	0,16W
3801	482205120333	33 K	0,1W
3802	482211711449	2,2 K	0,1W
3803	482211683864	10 K	0,16W
3804	482211652244	15 K	0,16W
3805 ⚠	212010690597	10 R	FUSE
3806	482211683884	47 K	0,16W
3807	482211711449	2,2 K	0,1W
3808	482211711449	2,2 K	0,1W
3809	482211652303	8,2 K	0,16W
3810	482211710834	47 K	0,1W
3811	482211711148	56 K	0,1W
3812 ⚠	212010690597	10 R	FUSE
3813	482205120101	100 R	0,1W
3814	482205120101	100 R	0,1W
3815	482211683883	470 R	0,16W
3816	482211710833	10 K	0,1W
3816	482205120105	1 M	0,1W
3817	482211652175	100 R	0,16W
3818	482211652219	330 R	0,16W
3819	482211652219	330 R	0,16W
3820	482211652219	330 R	0,16W
3821	482211652219	330 R	0,16W
3822	482211652175	100 R	0,16W
3823	482211652175	100 R	0,16W
3824	482205120101	100 R	0,1W
3825	482205120101	100 R	0,1W
3826	482205120101	100 R	0,1W
3827	482205120472	4,7 K	0,1W
3828	482211711449	2,2 K	0,1W
3829	482211711449	2,2 K	0,1W
3830	482211710833	10 K	0,1W
3831	482211710833	10 K	0,1W
3832	482211683864	10 K	0,16W
3833	482205120101	100 R	0,1W
3834	482205120472	4,7 K	0,1W
3836	482211652231	820 R	0,16W
3837	482205120101	100 R	0,1W
3838	482205011002	1 K	0,16W
3839	482205011002	1 K	0,16W
3840	482211711449	2,2 K	0,1W
3841	482205120101	100 R	0,1W
3842	482205120472	4,7 K	0,1W
3843	482205011002	1 K	0,16W
3844	482205120472	4,7 K	0,1W
3845	482211652175	100 R	0,16W
3846	482211683864	10 K	0,16W

Recorder Unit Board (RUBAD)

3847	482211711503	220 R	0,1W
3848	482211683883	470 R	0,16W
3849	482211652175	100 R	0,16W
3850	482211710834	47 K	0,1W
3851	482211652175	100 R	0,16W
3852	482211652283	4,7 K	0,16W
3853	482211652283	4,7 K	0,16W
3854	482205011002	1 K	0,16W
3855	482211683864	10 K	0,16W
3856	482211710834	47 K	0,1W
3857	482205011002	1 K	0,16W
3858	482211652283	4,7 K	0,16W
3859	482211710833	10 K	0,1W
3860	482211710833	10 K	0,1W
3861	482211710833	10 K	0,1W
3862	482211710833	10 K	0,1W
3863	482211710833	10 K	0,1W
3864	482211710833	10 K	0,1W
3865	482211652219	330 R	0,16W
3866	482211683864	10 K	0,16W
3867	482211710833	10 K	0,1W
3868	482211683883	470 R	0,16W
3869	482211652257	22 K	0,16W
3870	482211683876	270 R	0,16W
3871	482205120101	100 R	0,1W
3872	482205120223	22 K	0,1W
3873	482211683872	220 R	0,16W
3874	482211710833	10 K	0,1W
3875	482211652175	100 R	0,16W
3876	482211683884	47 K	0,16W
3877	482205011002	1 K	0,16W
3878	482205110102	1 K	0,1W
3879	482211652206	120 R	0,16W
3881	482211711449	2,2 K	0,1W
3882	482211683883	470 R	0,16W
3883	482205120101	100 R	0,1W
3884	482211683864	10 K	0,16W
3885	482211652256	2,2 K	0,16W
3886	482205120101	100 R	0,1W
3887	482205120223	22 K	0,1W
3888	482205110102	1 K	0,1W
3889	482211652175	100 R	0,16W
3890	482211683864	10 K	0,16W
3891	482205110102	1 K	0,1W
3892	482211652191	33 R	0,16W
3893	482211652256	2,2 K	0,16W
3894	482211711507	6,8 K	0,1W
3895	482211710834	47 K	0,1W
3896	482211652283	4,7 K	0,16W
3897	482211711449	2,2 K	0,1W
3898	482211711504	270 R	0,1W
3899	482211652213	180 R	0,16W
3900	482211652283	4,7 K	0,16W
3901	482211710834	47 K	0,1W
3902	482211710833	10 K	0,1W
3903	482205110102	1 K	0,1W
3904	482211683864	10 K	0,16W
3905	482211683864	10 K	0,16W
3906	482205011002	1 K	0,16W
3907	482211683864	10 K	0,16W
3908	482211652175	100 R	0,16W
3909	482205110102	1 K	0,1W
3910	482211683872	220 R	0,16W
3911	482205120101	100 R	0,1W
3912	482211652186	22 R	0,16W
3913	482211652283	4,7 K	0,16W
3914	482205012704	270 K	
3915	482211652257	22 K	0,16W
3916	482205120471	470 R	0,1W
3917	482205120471	470 R	0,1W
3918	482211711448	180 R	0,1W
3919	482205120122	1,2 K	0,1W
3920	482211711449	2,2 K	0,1W
3921	482211652175	100 R	0,16W
3922	482211710833	10 K	0,1W
3923	482205120472	4,7 K	0,1W
3924	482211683883	470 R	0,16W
3925	482211683884	47 K	0,16W
3926	482211710833	10 K	0,1W
3927	482211652175	100 R	0,16W
3928	482205120101	100 R	0,1W
3929	482211652175	100 R	0,16W
3930	482211683884	47 K	0,16W
3931	482205120108	1 R	
3932	482211652175	100 R	0,16W
3933	482211652175	100 R	0,16W
3934	482211652175	100 R	0,16W
3935	482211711507	6,8 K	0,1W
3936	482211711507	6,8 K	0,1W
3937	482205120332	3,3 K	0,1W
3938	482205120472	4,7 K	0,1W
3939	482211711449	2,2 K	0,1W
3940	482211711449	2,2 K	0,1W
3941	482211711139	1,5 K	0,1W
3942	482211652213	180 R	0,16W
3943	482205110102	1 K	0,1W
3944	482211652213	180 R	0,16W
3945	482211683864	10 K	0,16W
3946	482211683864	10 K	0,16W
3947	482211652175	100 R	0,16W
3948	482205120472	4,7 K	0,1W
3949	482211683883	470 R	0,16W
3950	482205120472	4,7 K	0,1W
3951	482211652175	100 R	0,16W
3952	482211683883	470 R	0,16W
3956	482211652228	680 R	0,16W
3959	482205120101	100 R	0,1W
3960	482205120101	100 R	0,1W
3961	482211652234	100 K	0,16W
3962	482211652175	100 R	0,16W
3963	482205120101	100 R	0,1W
3964	482205120474	470 K	0,1W
3965	482211711507	6,8 K	0,1W
3966	482205120105	1 M	0,1W
3967	482205120105	1 M	0,1W
3968	482211711507	6,8 K	0,1W
3970	482211710833	10 K	0,1W
3971	482211683864	10 K	0,16W
3973	482211652175	100 R	0,16W
3974	482211652175	100 R	0,16W
3976	482211683864	10 K	0,16W
3980	482211711503	220 R	0,1W
3981	482211711503	220 R	0,1W
3982	482211683872	220 R	0,16W
3983	482211683872	220 R	0,16W
3984	482211711503	220 R	0,1W
3985	482211683872	220 R	0,16W
3986	482211683872	220 R	0,16W
3987	482211683872	220 R	0,16W
3991	482211711449	2,2 K	0,1W
3992	482205120474	470 K	0,1W
3993	482205120474	470 K	0,1W
3994	482211711449	2,2 K	0,1W
3995	482205120333	33 K	0,1W
3996	482205120474	470 K	0,1W
3997	482211652234	100 K	0,16W
3998	482211710833	10 K	0,1W
3999	482211710833	10 K	0,1W

CHIP JUMPER

4000	482205120008	CHIP JUMPER
4011	482205120008	CHIP JUMPER
4021	482205120008	CHIP JUMPER
4022	482205120008	CHIP JUMPER
4023	482205120008	CHIP JUMPER
4111	482205120008	CHIP JUMPER
4112	482205120008	CHIP JUMPER
4113	482205120008	CHIP JUMPER

Recorder Unit Board (RUBAD)

4114	482205120008	CHIP JUMPER
4115	482205120008	CHIP JUMPER
4116	482205120008	CHIP JUMPER
4117	482205120008	CHIP JUMPER
4198	482205120008	CHIP JUMPER
4199	482205120008	CHIP JUMPER
4302	482205120008	CHIP JUMPER
4303	482205120008	CHIP JUMPER
4304	482205120008	CHIP JUMPER
4305	482205120008	CHIP JUMPER
4306	482205120008	CHIP JUMPER
4307	482205120008	CHIP JUMPER
4308	482205120008	CHIP JUMPER
4321	482205120008	CHIP JUMPER
4323	482205120008	CHIP JUMPER
4324	482205120008	CHIP JUMPER
4325	482205120008	CHIP JUMPER
4326	482205120008	CHIP JUMPER
4499	482205120008	CHIP JUMPER
4601	482205120008	CHIP JUMPER
4602	482205120008	CHIP JUMPER
4603	482205120008	CHIP JUMPER
4620	482205120008	CHIP JUMPER
4621	482205120008	CHIP JUMPER
4642	482205120008	CHIP JUMPER
4643	482205120008	CHIP JUMPER
4644	482205120008	CHIP JUMPER
4645	482205120008	CHIP JUMPER
4646	482205120008	CHIP JUMPER
4800	482205120008	CHIP JUMPER
4801	482205120008	CHIP JUMPER
4802	482205120008	CHIP JUMPER
4803	482205120008	CHIP JUMPER
4804	482205120008	CHIP JUMPER
4805	482205120008	CHIP JUMPER
4806	482205120008	CHIP JUMPER
4807	482205120008	CHIP JUMPER
4808	482205120008	CHIP JUMPER
4827	482205120008	CHIP JUMPER
4830	482205120008	CHIP JUMPER
4831	482205120008	CHIP JUMPER
4836	482205120008	CHIP JUMPER
4838	482205120008	CHIP JUMPER
4839	482205120008	CHIP JUMPER
4903	482205120008	CHIP JUMPER
4960	482205120008	CHIP JUMPER
4961	482205120008	CHIP JUMPER

COILS

5001	482215751462	10µH
5002	482215711145	150µH
5003	482215751462	10µH
5004	482215711149	56µH
5005	482215711142	47µH
5006	482215710972	15µH
5007	482215711706	10µH
5008	482215711228	100µH
5009	482215711228	100µH
5070	482215711139	6,8µH
5071	482215711149	56µH
5072	482215711706	10µH
5073	482215711235	22µH
5074	242253594699	27µH
5100	482215711142	47µH
5150	319801813370	330nH
5160	242253594885	470µH
5300	482215770877	0,256µH
5301	482215770877	0,256µH
5302	482215710972	15µH
5303	482215711231	1µH
5304	482215711525	6,8µH
5305	482215711525	6,8µH
5307	482215711231	1µH
5308	482215771206	COIL BLM21
5471	319801813370	330nF
5600	482215711249	10mH
5601	482215711249	10mH
5602	482215753531	COIL ASSY
5604	482215771206	COIL BLM21
5640	482215750961	22µH
5641	482215810604	6,8µH
5670	482215751462	10µH
5671	482215751462	10µH
5672	482215711228	100µH
5900	482215771206	COIL BLM21
5901	482215711706	10µH
5902	482215771206	COIL BLM21
5903	482215711706	10µH
5960	482215711139	6,8µH
5991	242252700513	BUZZER PIEZO CB13PA-X5

DIODES

6150	482213034173	BZX79-C5V6
6151	482213034173	BZX79-C5V6
6152	482213030621	1N4148
6153	482213030621	1N4148
6154	482213034173	BZX79-C5V6
6160	482213032245	BYV10-40
6161	482213032245	BYV10-40
6300	482213010414	BA792
6301	482213010414	BA792
6303	482213010414	BA792
6304	482213010414	BA792
6460	482213010231	Kit: 2x Sens. + 1x LED
6600	482213030861	BZX79-B7V5
6601	482213011031	BZX284-C12
6670	482213030621	1N4148
6671	482213034174	BZX79-C4V7
6672	532213031504	BZX79-C3V3
6801	482213083092	LED RED TLHR4205
6802	482213083092	LED RED TLHR4205
6803	482213083092	LED RED TLHR4205
6956	482213031983	BAT85
6970	482213031983	BAT85
6991	482213083757	BAS216
6992	482213083757	BAS216

TRANSISTORS AND IC's

7000	482213060511	BC847B
7002	482220915526	LC89980M
7003	532213060508	BC857B
7004	482220916883	LA71527M
7005	482213060511	BC847B
7007	482213010872	PDTA124ET
7010	482213060511	BC847B
7011	532213042718	BFS20
7012	532213042718	BFS20
7013	482213060511	BC847B
7014	532213060508	BC857B
7070	532213060508	BC857B
7071	482213060511	BC847B
7072	932213179682	LA7339
7073	482213060511	BC847B
7074	482213060511	BC847B
7100	482213010872	PDTA124ET
7102	482213010872	PDTA124ET
7103	482213060511	BC847B
7104	482220913121	STV5742DT
7105	482220915548	STV5744ADT
7106	482213063732	PDTC124ET
7150	482213041246	BC327-25
7151	482213041246	BC327-25
7152	482213060511	BC847B
7153	482213060511	BC847B

Recorder Unit Board (RUBAD)

7155	482213060511	BC847B
7157	482213060511	BC847B
7160	482213060511	BC847B
7161	482213041246	BC327-25
7300	482213063732	PDTC124ET
7301	933372960653	HEF4053BT
7302	482213063732	PDTC124ET
7304	482213063732	PDTC124ET
7305	532213060508	BC857B
7307	482213063732	PDTC124ET
7308	482213063732	PDTC124ET
7309	935260611118	TDA9818T/V1
7309	935262113118	TDA9817T/V1
7440	482220930146	L2722
7442	482213060511	BC847B
7443	482220930836	SAA1310/N2
7446	482220913126	TDA5241
7461	482213010231	Kit: 2x Sens. + 1x LED
7462	482213010231	Kit: 2x Sens. + 1x LED
7464	482213010233	OPT CP TCRT5000L
7465	482213010233	OPT CP TCRT5000L
7501	532213060508	BC857B
7502	532213060508	BC857B
7503	933372960653	HEF4053BT
7504	532213060508	BC857B
7505	532213042718	BFS20
7600	482213060511	BC847B
7601	482213060511	BC847B
7602	482213060373	BC856B
7603	482213041246	BC327-25
7604	532213060159	BC846B
7605	532213060159	BC846B
7606	482213060511	BC847B
7607	482213042615	BC817/40
7640	935261579557	TDA9605H
7670	932213150668	MSP3415D
7800	532220961472	LM393DT
7801	482213010234	OPT CP TCST1030L
7802	482213060511	BC847B
7803	482213060511	BC847B
7807	532213060508	BC857B
7808	482213041344	BC337-40
7810	482221811745	OPT SEN TSOP1736
7811	482213060511	BC847B
7815	532213060508	BC857B
7816	532213060508	BC857B
7817	482213010872	PDTA124ET
7818	482220916954	ST24E16M6
7900	482220916884	TMP93C071F
7901 ▲	310317855310	FLASH ROM DTAP2 (programmed)
7901 ▲	310317855320	FLASH ROM DTAP1 (programmed)
7901	310317855200	FLASH ROM DTAP5 (programmed)
7902	932213052668	CY62256LL
7903	482220916778	TL7705
7960	482220915504	SDA 5650
7970	482220990425	PCF8593P
7971	482213060511	BC847B
7991	482213060511	BC847B
7992	482213060511	BC847B
7993	482213060511	BC847B
7994	482220973852	PMBT2369
7995	482213010802	FETSIG BSH101
7996	482213010802	FETSIG BSH101

Audio Board (APDOD)

MISCELLANEOUS

1800	482224210434	CRYSTAL 18,43MHz
1801	482224210434	CRYSTAL 18,43MHz
1974	242202516133	CONNECTOR 15 Pins
1975	242202516133	CONNECTOR 15 Pins
1976	482226710618	CONNECTOR 7 Pins

CAPACITORS

2800	532212610225	1,5 pF	50V
2801	532212610225	1,5 pF	50V
2804	482212421732	10 µF	25V
2809	482212421732	10 µF	25V
2810	482212613196	100 nF	16V
2811	482212421732	10 µF	25V
2812	482212421732	10 µF	25V
2813	482212610002	100 nF	50V
2814	482212233177	10 nF	50V
2815	482212421732	10 µF	25V
2816	482212233177	10 nF	50V
2817	482212613196	100 nF	16V
2818	482212613196	100 nF	16V
2821	482212421732	10 µF	25V
2822	482212421732	10 µF	25V
2823	482212613693	56 pF	50V
2824	482212613693	56 pF	50V
2825	482212421732	10 µF	25V
2826	482212613693	56 pF	50V
2827	532212234123	1 nF	50V
2828	532212234123	1 nF	50V
2829	482212613196	100 nF	16V
2830	482212613836	1 µF	16V
2831	482212440769	4,7 µF	50V
2832	482212613836	1 µF	16V
2833	482212613836	1 µF	16V
2834	532212610225	1,5 pF	50V
2835	532212610225	1,5 pF	50V
2836	482212233177	10 nF	50V
2837	482212421732	10 µF	25V
2838	482212233177	10 nF	50V
2840	532212234123	1 nF	50V
2841	532212234123	1 nF	50V
2844	532212234123	1 nF	50V
2845	532212234123	1 nF	50V
2900	482212613836	1 µF	16V
2901	482212421732	10 µF	25V
2903	482212613836	1 µF	16V
2904	532212232658	22 pF	50V
2905	482212613836	1 µF	16V
2906	482212421732	10 µF	25V
2908	482212613836	1 µF	16V
2909	482212480231	47 µF	16V
2910	532212232658	22 pF	50V
2927	482212613196	100 nF	16V
2929	482212613836	1 µF	16V
2930	482212613836	1 µF	16V

RESISTORS

3800	482211652175	100 R	0,16W
3801	482211652175	100 R	0,16W
3802	482211710833	10 K	0,1W
3804	482205120101	100 R	0,1W
3805	482211710834	47 K	0,1W
3806	482205120101	100 R	0,1W
3808	482211710833	10 K	0,1W
3809	482211710833	10 K	0,1W
3810	482211683881	390 R	0,16W
3811	482211683881	390 R	0,16W
3812	482211683864	10 K	0,16W
3900	482211710833	10 K	0,1W
3902	482211683883	470 R	0,16W

▲ ... Safety component, use only this type

Audio Board (APDOD)

3903	482211713579	220 K	0,1W
3905	482205011002	1 K	0,16W
3907	482211652234	100 K	0,16W
3908	482205120104	100 K	0,1W
3909	482211713579	220 K	0,1W
3911	482211683883	470 R	0,16W
3912	482205120104	100 K	0,1W
3914	482205011002	1 K	0,16W
3915	482211710833	10 K	0,1W
3918	482211652234	100 K	0,16W

CHIP JUMPER

4811	482205120008	CHIP JUMPER
4815	482205120008	CHIP JUMPER
4816	482205120008	CHIP JUMPER
4820	482205120008	CHIP JUMPER
4824	482205120008	CHIP JUMPER
4826	482205120008	CHIP JUMPER
4832	482205120008	CHIP JUMPER

COILS

5800	482215711706	10µH
5801	482215711706	10µH
5803	482215711706	10µH
5804	482215711228	100µH
5805	482215711706	10µH

DIODES, TRANSISTORS & IC's

6801	482213083757	BAS216
7801	482220915832	MSP3410D-B4
7802	932213147682	DPL3518A
7900	482220970672	LM358N
7901	532213042755	BC847C
7902	482213010872	PDTA124ET
7904	532213042755	BC847C
7905	482213010872	PDTA124ET
7913	482213011155	PDTC114ET

Mainsfilter Board (MFSWD)

1701	▲	242212802786	MAINS SWITCH
1702	▲	482225630274	FUSE HOLDER
1703	▲	482207031602	FUSE T 1,6A
1705		482225211215	SURGE PROTECTION
1935		482226520723	CONNECTOR 2 Pins
2708	▲	202233000018	470 nF
3702		482211621227	VDR 470V
3714		482211683872	220 R
3715	▲	482205321335	3,3 M
5709		242254944161	MAINS FILTER HF2430B
5710	▲	312121861321	MAINS FILTER TU305B2

▲ ... Safety component, use only this type

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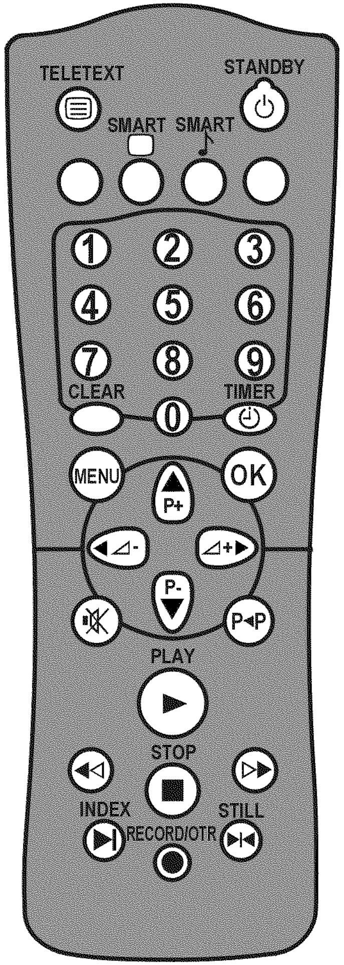
OPERATING INSTRUCTIONS IN BRIEF

The remote control

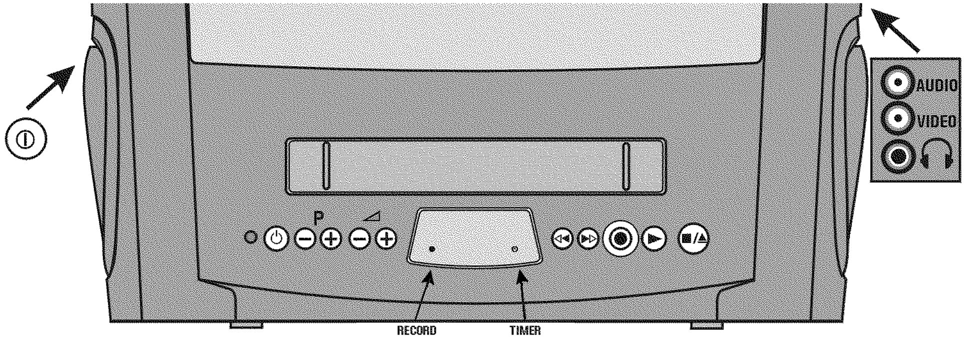


TELETEXT ▤	**TELETEXT**: To switch TELETEXT on or off
STANDBY ⏻	**Switch off** : To switch off set, interrupt menu function, interrupt a programmed recording (TIMER)
SMART (green)	**SMART PICTURE (green)**: To show the preset picture settings
SMART ♪ (yellow)	**No function**
0-9	**Number buttons**: 0 - 9
CLEAR	**Delete** : To delete last entry or clear programmed recording (TIMER)
TIMER ⏲	**TIMER**: To make a manual TIMER programming or to alter or clear a programmed TIMER
MENU	**Menu** : To call up or end main menu
OK	**Store/Confirm**: To store or confirm entry
P +/− ▲▼	**Programme number**: To select a programme number up or down
P − ▼	**Select**: One line up
▲ P +	**Select**: One line down
⊿ +/− ◀▶	**Volume**: To regulate the volume
◀ ⊿ −	**Select**: Cursor left
⊿ + ▶	**Select**: Cursor right
🔇	**Volume off**: To switch the volume on or off
P◂P	**Previous programme number**: To select the previous programme number
PLAY ▶	**Playback** : To play a recorded cassette
◁◀	**Rewind** : During STOP and STANDBY: rewind, during PLAYBACK: reverse scanning
STOP ■	**Pause/Stop**: To stop the tape, except while a TIMER-recording is being made
▶▷	**Forward wind**: During STOP and STANDBY: forward wind, during PLAYBACK: forward scanning
INDEX ▶|	**Index search**: In combination with ◁◀ / ▶▷ : to search for previous/next recording on the cassette.
RECORD/OTR ●	**Record**: To record the programme selected
STILL ▶|◀	**Still picture**: To stop the tape and show a still picture

Coloured TELETEXT buttons: To select TELETEXT pages directly

(red)	**TELETEXT:** Select page/chapter shown at the bottom of the screen
(green)	**TELETEXT:** Select page/chapter shown at the bottom of the screen
(yellow)	**TELETEXT:** Select page/chapter shown at the bottom of the screen
(blue)	**TELETEXT:** Select page/chapter shown at the bottom of the screen

Front of the set



⏼ **Power switch** : To switch off the set
Beware: When you switch the set off with the power switch, TIMER-recordings are not possible!

⏻ **Standby** : To switch off, interrupt a function, interrupt a programmed recording (TIMER)

P +/– **Programme number** : To select programme number up or down

◺ +/– **Volume**: To regulate the volume

◁◀ **Rewind** : During STOP and STANDBY: rewind, during PLAYBACK: reverse scanning

▶▷ **Forward wind**: During STOP and STANDBY: forward wind, during PLAYBACK: forward scanning

◉ **Record**: To record the programme selected

▶ **Playback** : To play a recorded cassette

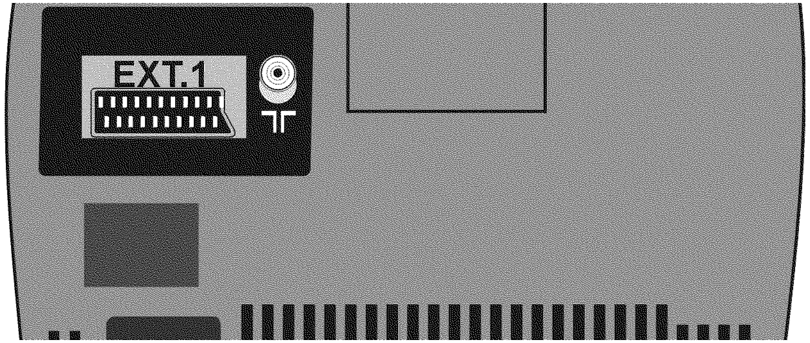
⏏/■ **Pause/Stop, eject cassette**: To stop the tape and during STOP eject the cassette

AUDIO **Audio input socket**

VIDEO **Video input socket** : To connect a camcorder or videogames

🎧 **Headphones socket**: To connect headphones

Back of the set



EXT.1 **Scart socket**: To connect a satellite receiver, decoder, video recorder, etc.

ᒣᒥ **Aerial input socket**: To connect the aerial cable

OPERATING INSTRUCTIONS PHILIPS 14PV320/05

Congratulations! You now own one of the most sophisticated and simple-to-use TV-VIDEO Combinations on the market. With this TV-VIDEO Combi you can record and play VHS-standard cassettes.

Please take the time to read this operating manual before using your TV-VIDEO Combi.

Safety instructions and other notes

⚠ **Danger: High voltage!**
Do not remove the top cover as there is a risk of an electrical shock!

⚠ The TV-VIDEO Combi does not contain any components that can be repaired by the customer. To switch off the TV-VIDEO Combi completely you must push the mains switch.

⚠ Make sure that air can circulate freely through the ventilation slots on the TV-VIDEO Combi.

⚠ Make sure that no objects or liquids enter the TV-VIDEO Combi. If liquid is spilt into it, disconnect the TV-VIDEO Combi immediately from the power supply and call the After-sales Service for advice.

⚠ The TV-VIDEO Combi should **not be used immediately after transportation** from a cold to a hot area or vice versa, or in conditions of extreme humidity.
After unpacking the TV-VIDEO Combi, it should be allowed to **acclimatize for at least three hours** before installation.

♻ These operating instructions have been printed on nonpolluting paper.

♻ Deposit old batteries at the relevant collection points.

♻ Please make use of the facilities available in your country for disposing of the packaging of the TV-VIDEO Combi in a way that helps to protect the environment.

♻ This electronic equipment contains many materials that can be recycled. Please inquire about the possibilities for recycling your old set.

ⓘ VIDEOPlus+ and PlusCode are registered trademarks of Gemstar Development Corporation. The VIDEOPlus+ system is manufactured under licence from Gemstar Development Corporation.

So that you can identify your machine in the event of theft, enter the serial number (PROD.NO) here. The serial number is printed on the type plate fixed at the rear of the set.

MODEL NO.	**14PV320/05**
PROD.NO:......	

This product complies with the requirements of the Directive 73/23/EEC + 89/336/EEC + 93/68/EEC.

Technical information

Measurements in cm (W / H / D): 39.2 / 40.7 / 39.8
Power consumption (Standby) : less than 45W (less than 4W)
Voltage : 198-264V 50Hz
Headphones : Output resistance less than 120 Ohms maximum output voltage more than 2.6V at 120 Ohms

Emergency interrupt

You can use the STANDBY ⏻ button on the TV-VIDEO Combi or the remote control to interrupt any function.
If you want to interrupt a running Timer recording, hold the STANDBY ⏻ button for several seconds.
So if you are having operating problems, you can just interrupt the function and start again.
And you can practise operating your set without any worries. No matter which buttons you press, you cannot damage it.

Special functions on your TV-VIDEO Combi

SmartClock	If a television programme, which transmits TELETEXT, is stored with programme number 'P01', time and date will be set automatically.
Digital Studio Picture Control	Philips has developed a system which produces the best possible playback quality. It reduces disturbance on old, worn video cassettes, and emphasises the detail on very good quality cassettes.
Smart Picture	This function allows you to save the playback settings that suit you best. Select your own personal settings for the type of film you are currently watching.
Plug & Play	When you have plugged your TV-VIDEO Combi into the mains, you will be welcomed with an OSD picture. All you have to do is follow the instructions in the "intelligent help line" for the next step. Enjoy the Automatic TV channel search/save function and the automatic time adjustment.
AVL	Automatic Volume Leveller. It minimises sudden changes in TV volume when commercial spots are transmitted.
2000	We guarantee that your TV-VIDEO Combi will switch to the new millennium with no problems whatsoever.
VIDEO Plus+®	Simple programming system for TV-VIDEO Combis. Makes programming as easy as making a telephone call. Simply enter the programme code which you will find in your listings magazine.
TURBO DRIVE	The precision tape drive from Philips with rewind times of 100 seconds (E180) and automatic tape length recognition.

1. CONNECTING YOUR TV-VIDEO COMBI

Important for the United Kingdom

This machine is fitted with an approved moulded 13 Amp plug. To change a fuse in this type of plug, please follow these instructions.

1. Take off the fuse cover and take out the fuse.
2. Put in a new fuse which should be a BS1362 3A, A.S.T.A. or BSI approved type.
3. Refit the fuse cover.

If the plug fitted is not suitable for your socket, cut it off and fit another type.
If the plug you fit contains a fuse, it should be a 3Amp fuse. If you fit a plug which does not need a fuse, make sure the fuse on your fuse box is not greater than 5 Amps.

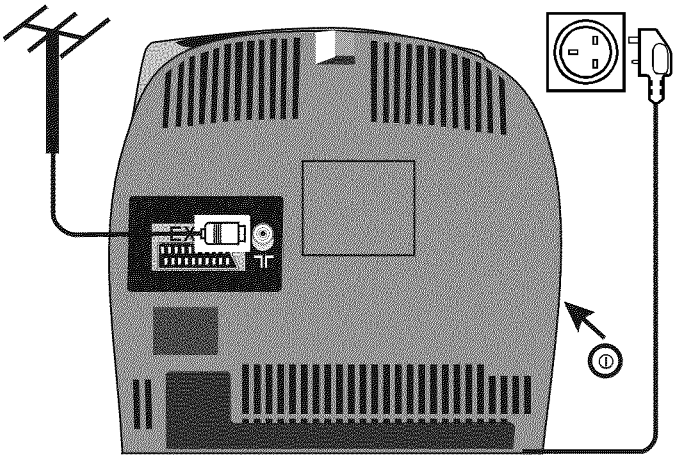
▷ Note: Please destroy the plug you have cut off so that it cannot be used in a 13 Amp socket somewhere else.

How to connect a plug
The wires in the lead from the video recorder are coloured as follows.
* Blue - 'neutral' ('N').
* Brown - 'live' ('L').

4. Connect the blue wire to the terminal in the plug which is marked with the letter 'N' or coloured black.
5. Connect the brown wire to the terminal in the plug which is marked with the letter 'L' or coloured red.
6. Do not connect either of the wires to the terminal in the plug which is marked with the letter 'E', the symbol ⏚ or coloured green or green and yellow.

Before you refit the plug cover, make sure that the grip at the bottom of the plug is clamped over the plastic cover of the lead, not just over the two wires.

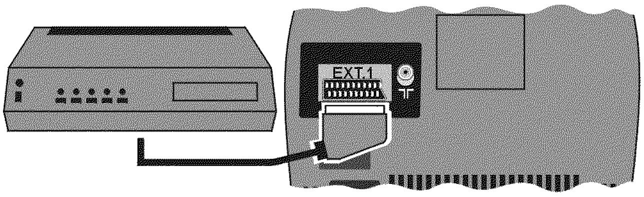
Connecting the cables



1. Insert the aerial plug into the ⊤⊤ socket.
2. Insert the plug of the mains cable into the wall socket.
3. If the little red light at the front of the set is not alight, please switch on the set. The power switch ⏻ is located on the left side panel of the set.

Connecting a decoder or other equipment

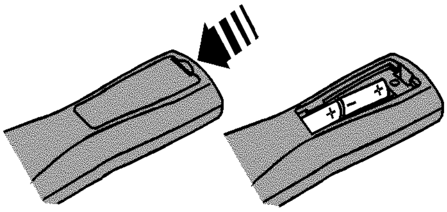
You can also connect additional equipment to the EXT.1 socket. For instance, a satellite receiver, decoder or camcorder.



2. INSTALLING YOUR TV-VIDEO COMBI

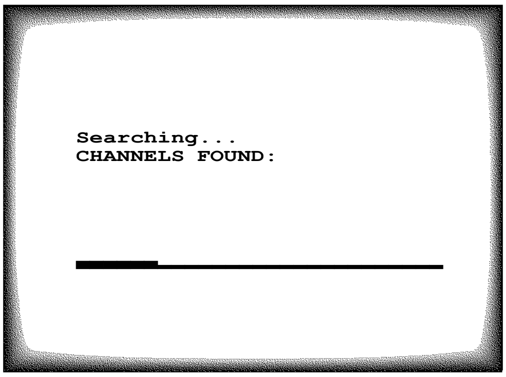
Initial installation

1 Open up the battery compartment of your remote control and place the batteries in it as shown in the picture.



2 Close the battery compartment.

3 If you have connected the aerial to the TV-VIDEO Combi, press the OK button.
'Automatic TV channel search' starts. This picture will appear on the screen:



```
Searching...
CHANNELS FOUND:
```

Wait until all TV channels have been found. This can take several minutes.
The initial installation is now complete.

▷ If you have connected a decoder, you must install it as described in the next section.

▷ If you have connected a satellite receiver, please read the section 'satellite receiver'.

Allocating a decoder

Some TV stations will send coded TV channels, that you can only watch when you use a decoder. You can connect such a decoder (descrambler) to your TV-VIDEO Combi. With the following function, the connected decoder will automatically be activated for the TV programme you want to watch.

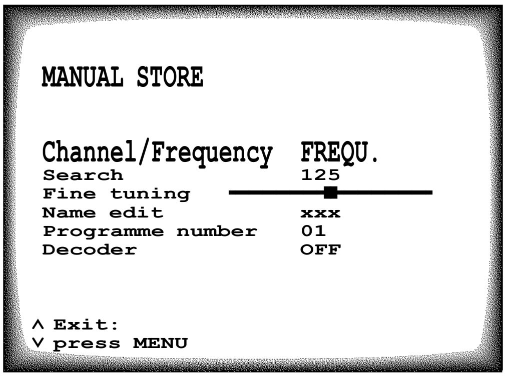
1 Choose the TV channel on which you wish to use the decoder with the +⊿▶ or ◀⊿– buttons on the TV-VIDEO Combi or the number buttons 0-9 on the remote control.

2 Press the MENU button on the remote control. The main menu will appear.

3 Select the line '`Installation`' with the ▲P+ or P–▼ buton and confirm with the ⊿+▶ button.

4 Select the line '`Manual store`' with the ▲P+ or P–▼ button and confirm with the ⊿+▶ button.

5 Select the line '`Decoder`' with the ▲P+ or P–▼ button.



```
MANUAL STORE

Channel/Frequency   FREQU.
Search              125
Fine tuning
Name edit           xxx
Programme number    01
Decoder             OFF

∧ Exit:
∨ press MENU
```

6 Select function '`ON`' with the ◀⊿– or ⊿+▶ button. When you select '`OFF`', the function will be switched off.

7 Confirm with the OK button.

8 To end, press the MENU button.
Your decoder has now been allocated to this TV channel.

9 Press the MENU button again.

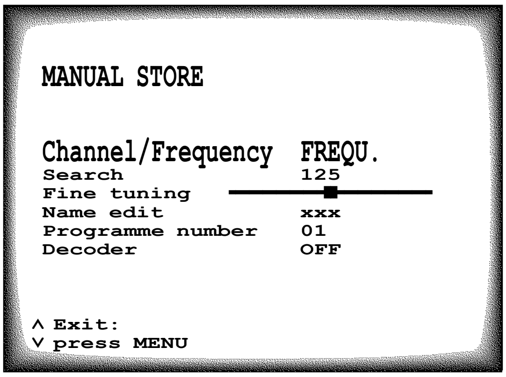
Manual TV channel search

In certain cases the 'Automatic TV channel search' may not be able to find all of the TV channels (e.g. coded TV channels). In that case, use this manual method to set the channels.

1 Press the MENU button on the remote control. The main menu will appear.

2 Select the line '`Installation`' with the ▲P+ or P−▼ button and confirm with the ⊿+► button.

3 Select the line '`Manual store`' with the ▲P+ or P−▼ button and confirm with the ⊿+► button.



```
MANUAL STORE

Channel/Frequency  FREQU.
Search             125
Fine tuning
Name edit          xxx
Programme number   01
Decoder            OFF

^ Exit:
v press MENU
```

4 In the line '`Channel/Frequency`', select the display for:

'`FREQU.`': frequency

'`C CH`': channel

'`S CH`': special channel

5 If you know the frequency or channel of the desired TV channel, you can enter the data in line '`Search`' with the digit buttons 0-9.

ⓘ If you don't know the frequency or channel of the TV channel of your choice, press the ⊿+► button to start the channel search.

6 In the line '`Programme number`' select the programme number you want e.g.: '`01`', using the ◄⊿− or ⊿+► button.

7 If you want to change the TV channel name, press the ⊿+► button in line '`Name edit`'.

☐ Select the number or letter you want to change with the ◄⊿− or the ⊿+► button. Change it with the ▲P+ or the P−▼ button. Select the next number or letter in the same way.

8 Press the OK button to store the changes you have made.

9 If you want to change the automatic tv channel setting, select the line '`Fine tuning`'.
With the ◄⊿− or ⊿+► button you can vary the automatic tv channel setting. **Important:** This re-tuning is only necessary and useful in **special cases**, e.g.: when there are stripes on the picture with cable-TV systems.

10 Press the OK button to store the TV channel.

ⓘ If you want to search for further TV channels, start again at step 5.

11 To end, press the MENU button.

Satellite receiver

You can receive channels from the satellite receiver via the scart socket EXT.1.
To do this, select the channel number '`E1`' with the P+/−▲▼ button. You will have to select the channels to be received by the satellite receiver on the receiver itself.

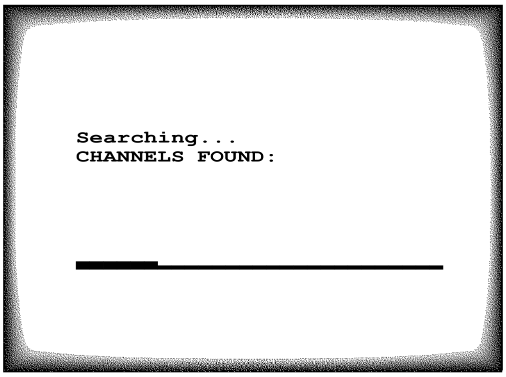
Special installation functions

You can select one of the following installation functions in order to adapt the TV-VIDEO Combi to your own specific requirements.

Automatic TV channel search

Your TV-VIDEO Combi will search for all TV channels.
If you want to start the automatic TV channel search again, then follow the instructions below.

1. Press the [MENU] button on the remote control. The main menu will appear.
2. Select the line '`Installation`' with the [▲P+] or [P−▼] button and confirm with the [⊿+▶] button.
3. Select the line '`Autoinstall`' with the [▲P+] or [P−▼] button.
4. Press the [⊿+▶] button. The 'Automatic TV channel search' starts.



```
Searching...
CHANNELS FOUND:
```

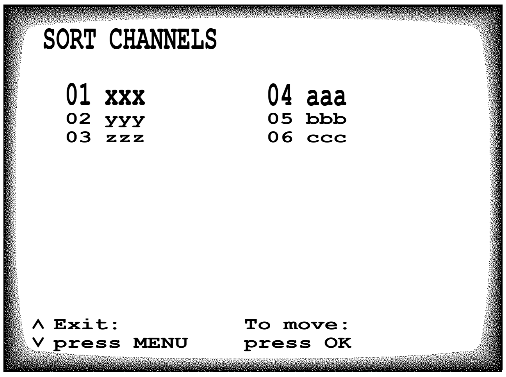
5. When the TV channel search is complete, '`Installation comp.`' will appear on the screen.

How to search for a TV channel manually, you can read in the section 'Manual TV channel search'.

Automatic Channel Installation (ACI):
Some cable companies or broadcasters offer the possibility to install TV channels automatically with 'ACI'.
Information about the installation offered and how to select it, will appear on the screen.
This set will recognize and install TV channels with 'ACI' automatically.
TV channels will be stored from programme number 1 onward.
If 'ACI' cannot identify a TV channel, you can search for it using the method as described in the section 'Manual TV Channel Search'.

Channel Number Allocation

1. Press the [MENU] button. The main menu appears.
2. Select the line '`Installation`' with the menu buttons [▲P+] or [P−▼] and confirm with the menu button [⊿+▶].
3. Select the line '`Sort channels`' with the menu buttons [▲P+] or [P−▼] and confirm with the menu button [⊿+▶].

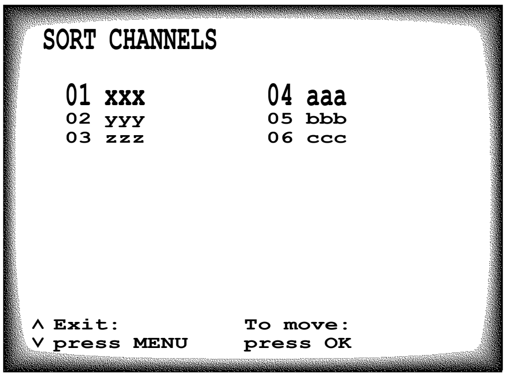


```
SORT CHANNELS

 01 xxx           04 aaa
 02 yyy           05 bbb
 03 zzz           06 ccc




∧ Exit:          To move:
∨ press MENU     press OK
```

4. With the menu buttons [▲P+], [P−▼], [◀⊿−] or [⊿+▶], select the TV channel to which you want to allocate a programme number and press the [OK] button.
5. With the menu buttons [▲P+], [P−▼], [◀⊿−] or [⊿+▶], shift the TV channel to the programme number you wish to allocate to this TV channel and press the [OK] button.
6. Repeat steps [4] and [5] until you have allocated a programme number to all the required TV channels.
7. To end, press the [MENU] button.

Delete a TV Channel

1. Press the MENU button. The main menu appears.
2. Select the line 'Installation' with the menu buttons ▲P+ or P−▼ and confirm with the menu button ⊿+▶.
3. Select the line 'Sort channels' with the menu buttons ▲P+ or P−▼ and confirm with the menu button ⊿+▶.



```
SORT CHANNELS

  01 xxx          04 aaa
  02 yyy          05 bbb
  03 zzz          06 ccc




^ Exit:          To move:
v press MENU     press OK
```

4. With the menu buttons ▲P+, P−▼, ◀⊿− or ⊿+▶, select the TV channel you want to delete and press the CLEAR button.
5. Repeat step 4, until you have deleted all the required TV channels.
6. To end, press the MENU button.

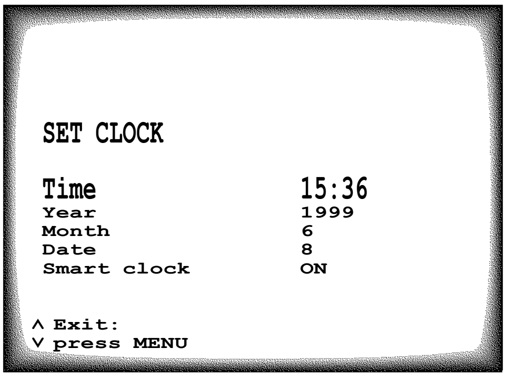
Setting the language

You can select the language for the on-screen display (OSD).

1. Press the MENU button on the remote control. The main menu will appear.
2. Select the line 'Installation' with the ▲P+ or P−▼ button and confirm with the ⊿+▶ button.
3. Select the line 'Language' with the ▲P+ or P−▼ button.
4. Select your language with the ◀⊿− or ⊿+▶ button.
5. To end, press the MENU button.

Setting the time and date

1. Press the MENU button on the remote control. The main menu will appear.
2. Select the line 'Installation' with the ▲P+ or P−▼ button and confirm with the ⊿+▶ button.
3. Select the line 'Set clock' with the ▲P+ or P−▼ button and confirm with the ⊿+▶ button.



```
SET CLOCK

Time                 15:36
Year                 1999
Month                6
Date                 8
Smart clock          ON

^ Exit:
v press MENU
```

4. Check the time in line 'Time'. If required, please change the time with the 0-9 buttons on the remote control.
5. Check 'Year', 'Month' and 'Date' in the same way. You can switch between entry fields with ▲P+ or P−▼ button. Confirm with the OK button.
6. To end, press the MENU button.

Automatic time and date setting (SMART CLOCK)

If a television programme, which transmits TELETEXT, is stored with programme number `P01`, time and date will be set automatically.

The clock will automatically be adjusted to winter time and summer time.

1. Press the MENU button on the remote control. The main menu will appear.

2. Select the line '`Installation`' with the ▲P+ or P−▼ button and confirm with the ⊿+▶ button.

3. Select the line '`Set clock`' with the ▲P+ or P−▼ button and confirm with the ⊿+▶ button.

4. Select the line '`Smart clock`' with the menu buttons ▲P+ or P−▼ .

5. Switch the function on with the menu buttons ◀⊿− or ⊿+▶ .

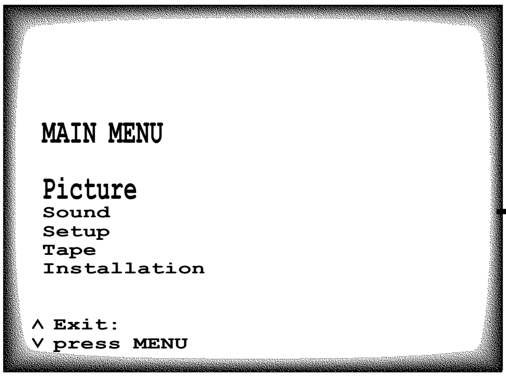
6. Confirm with the OK button.

7. To end, press the MENU button.

3. IMPORTANT NOTES FOR OPERATION

SUMMARY OF USER GUIDE

The OSD menu offers the following functions. More details on each can be found in the appropriate chapter.



MAIN MENU

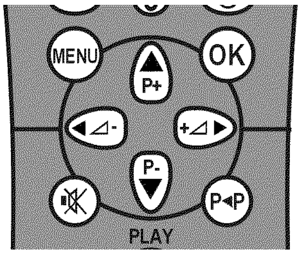
Picture
Sound
Setup
Tape
Installation

^ Exit:
v press MENU

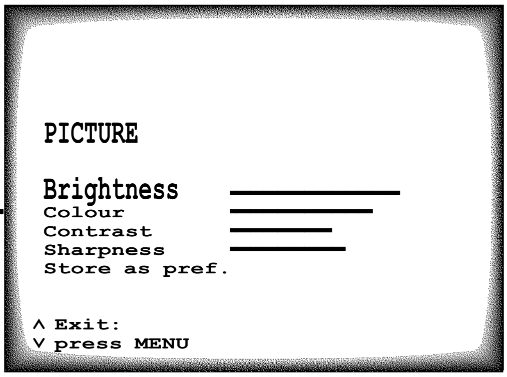
User guide (OSD)

The OSD (On-screen display) shows the various functions in the form of a menu on the television screen. You can then choose the settings you require. There is a summary of the menus on this page. The main button functions are displayed in a help line along the bottom of the screen.

- ☐ **To call up the menu:** With the MENU button.
- ☐ **To select a line:** With the ▲P+ or P–▼ button.
- ☐ **To enter or change your selection:** With the 0-9, ◄⊿– or +⊿► button.
- ☐ **To cancel:** With the MENU button.
- ☐ **To save or confirm:** With the OK button.
- ☐ **To close the menu:** With the MENU menu button.



- ☐ **To confirm the messages in red on the screen:** Press the OK button.
- ☐ You can switch the machine on with the P+/–▲▼, P◄P or 0-9 button or by putting in a cassette.

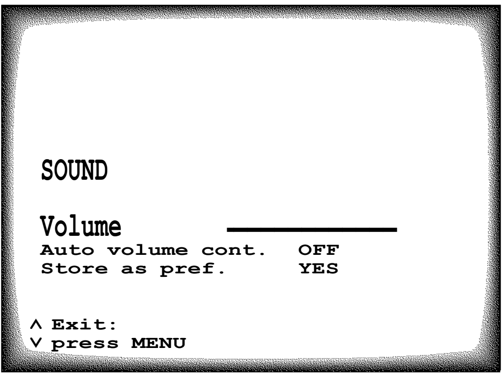


PICTURE

Brightness
Colour
Contrast
Sharpness
Store as pref.

^ Exit:
v press MENU

Chapter 'TV FUNCTIONS'

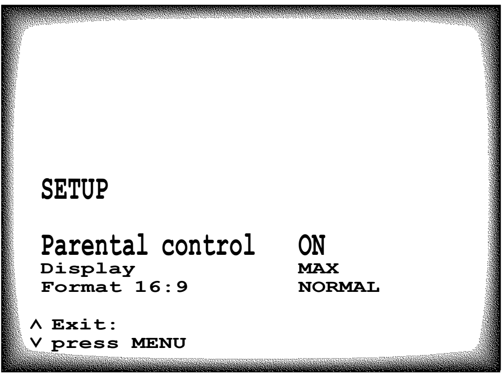


SOUND

Volume
Auto volume cont. OFF
Store as pref. YES

^ Exit:
v press MENU

Chapter 'TV FUNCTIONS'

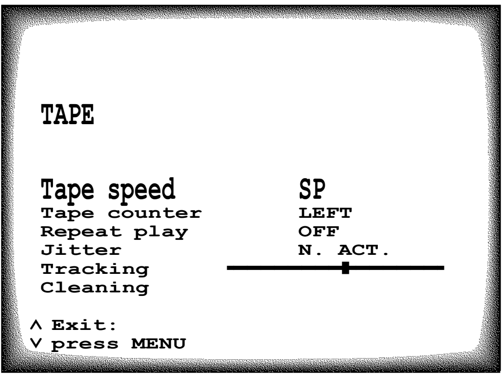


SETUP

Parental control ON
Display MAX
Format 16:9 NORMAL

^ Exit:
v press MENU

Chapter 'ADDITIONAL FUNCTIONS'



TAPE

Tape speed SP
Tape counter LEFT
Repeat play OFF
Jitter N. ACT.
Tracking
Cleaning

^ Exit:
v press MENU

Chapter 'PLAYBACK FUNCTIONS'

4. TV SET FUNCTIONS

Selecting a TV programme

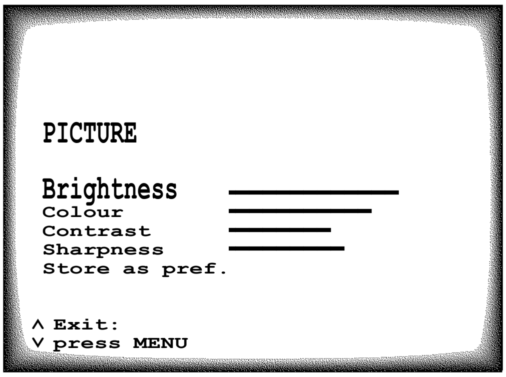
Select the required TV channel (=programme number) with the [P+/–▲▼] button or with the digit buttons [0-9] on the remote control.

ⓘ If you don't know the programme number of the required TV channel:

1. Press the [P+/–▲▼] button for more than 2 seconds. The TV channel list appears on the screen.
2. Select the required TV channel with the [P+/–▲▼] button.
   After 1 second the TV-VIDEO Combi will switch to the selected programme number.

Picture settings

1. Press the [MENU] button. The main menu will appear.
2. Select the line '`Picture`' with the buttons [▲P+] or [P–▼] and confirm with the button [⊿+▶].



PICTURE

Brightness
Colour
Contrast
Sharpness
Store as pref.

∧ Exit:
∨ press MENU

3. Select the required line with the buttons [▲P+] or [P–▼] and alter with the buttons [◀⊿–] or [⊿+▶].

   ⓘ To store this setting as a standard setting, select the line '`Store as pref.`' with the buttons [▲P+] or [P–▼]. Select 'YES' with the buttons [◀⊿–] or [⊿+▶]. Confirm with the [OK] button.

4. To end, press the [MENU] button.

Selecting the picture setting (SMART PICTURE)

ⓘ **'SMART PICTURE':** Optimises all picture settings using a single button on the remote control.

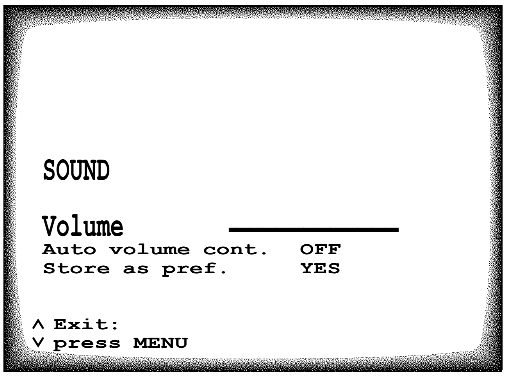
☐ Press the [SMART (green)] button repeatedly to select the required picture setting.

Volume control

You can control the volume level with the [⊿+/–◀▶] button. If you want to mute the sound temporarily (e.g.: during a telephone call), press the [🔇] button on the remote control. When you press the [🔇] button again, the sound will return at its original volume level.

Sound settings

1. Press the [MENU] button. The main menu will appear.
2. Select the line '`Sound`' with the [▲P+] or [P–▼] button and confirm with the [⊿+▶] button.



SOUND

Volume
Auto volume cont. OFF
Store as pref. YES

∧ Exit:
∨ press MENU

3. Select the required line with the [▲P+] or [P–▼] button and alter with the [◀⊿–] or [⊿+▶] button.

   ⓘ To store this setting as a standard setting, select the line '`Store as pref.`' with the buttons [▲P+] or [P–▼]. Select 'YES' with the buttons [◀⊿–] or [⊿+▶]. Confirm with the [OK] button.

   ⓘ To call up the standard settings, switch the TV-VIDEO Combi off and on again.

Automatic volume control (AVL)

☐ Switch on '`Auto volume cont.`' to activate the automatic volume control. It minimises sudden changes in TV volume when commercial spots are transmitted.

5. PLAYBACK FUNCTIONS

Playing a cassette

1. Put a cassette into the cassette slot.

2. Press the PLAY▶ button.

3. If you press the STOP■ button once, the TV-VIDEO Combi will switch to pause. To stop, press the STOP■ button again.

4. To eject the cassette, press the ▲/■ button on the TV-VIDEO Combi or press the STOP■ button on the remote control several seconds.

   ▷ Some hired cassettes may have a poor picture or poor sound quality. This is not a fault in your machine. Please read 'Eliminating picture interference'.

   ▷ Some functions switch off automatically after a while (for example, pause, still picture, picture search). This helps to protect the cassette and avoids wasting power.

Playing NTSC cassettes

With this set you can play cassettes that have been recorded on another video recorder in the NTSC standard (for example, American cassettes).

▷ Some special features (for example, still picture) are not possible while you are playing an NTSC cassette.

Tape position indication

▷ Press the OK button to display the current tape position.

▷ To change the type of tape position display, proceed as follows:

1. During playback, press the MENU button.

2. Select the line '`Tape`' with the menu buttons ▲P+ or P−▼ and confirm with the OK button.

3. Select the line '`Tape counter`' with the menu buttons ▲P+ or P−▼.

4. With the menu buttons ◀⊿− or ⊿+▶ select '`USED`' to check the time used, or '`LEFT`' to check the time left on the tape.

5. Confirm with the OK button.

Searching for tape position with the picture (picture search)

1. While a cassette is playing, press the ◁◀ (reverse) or ▶▷ (forward) button once or several times.

2. To stop at a certain picture, press the PLAY▶ button.

   ▷ During picture search, the picture quality may not be so good and there will be no sound.

Still picture

1. Press the STILL▶◀ button. A still picture will appear on the screen.

2. Each time you press STILL▶◀ again, the picture will move on one step.

Searching for tape position without the picture (wind and rewind)

1. Stop the tape with the STOP■ button.

2. Press the ◁◀ (reverse) or ▶▷ (forward) button.

3. To stop at a certain picture, press the STOP■ button.

Instant View

With this function you can switch to picture search during wind and rewind.

1. If you hold the ◁◀ (rewind) or ▶▷ (wind) button during wind or rewind, you will switch to picture search.

2. When you release the button, the TV-VIDEO Combi will automatically switch back to rewind or wind.

Automatic search for a tape position (index search)

At the start of each recording, the TV-VIDEO Combi will write an index code on the tape.

1 Press the [INDEX▶I] button. Press the [▶▷] button to select the next code mark or the [◁◀] button for the previous code mark.

2 When the TV-VIDEO Combi finds the code mark, it will automatically switch to play.

Picture interference

When the picture quality is poor when you play a cassette, please follow these instructions.

Tracking during playback

1 During playback, press the [MENU] button.

2 Select the line '`Tape`' with the menu buttons [▲P+] or [P−▼] and confirm with the [⊿+▶] button.

3 Select the line '`Tracking`' with the menu buttons [▲P+] or [P−▼].

4 Hold the menu buttons [◀⊿−] or [⊿+▶] until the playback quality is at its best.

5 Confirm with the [OK] button.

6 To end, press the [MENU] button. This setting will remain until you remove the cassette.

Tracking during still picture

If the still picture vibrates vertically, you can improve the still picture as follows:

1 During still picture, press the [MENU] button.

2 Select the line '`Tape`' with the [▲P+] button or [P−▼] and confirm with the [⊿+▶] button.

3 Select the line '`Jitter`' with the [▲P+] or [P−▼] button.

4 Hold the [◀⊿−] or [⊿+▶] button until the picture quality is at its best.

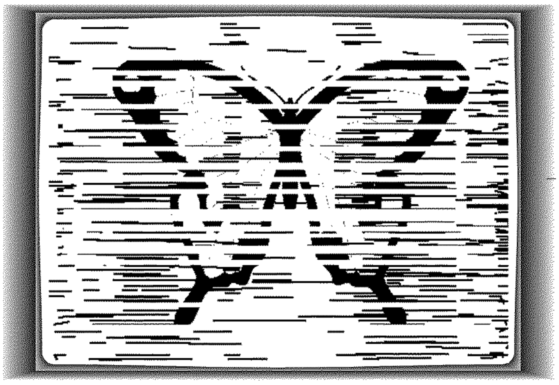
5 Confirm with the [OK] button.

6 To end, press the [MENU] button.

ⓘ Please note, however, that interference may still occur with poor quality cassettes.

Cleaning the video heads

If horizontal lines appear on the screen when you play a cassette, you should clean the video heads.



1 During playback, press the [MENU] button.

2 Select the line '`Tape`' with the menu buttons [▲P+] or [P−▼] and confirm with the [⊿+▶] button.

3 Select the line '`Cleaning`' with the menu buttons [▲P+] or [P−▼].

4 Press the [OK] button. '`CLEANING`' appears on the screen.

5 Wait a few seconds, until the message disappears and then press the [MENU] button.

6. MANUAL RECORDING

Use 'Manual Recording' to make a spontaneous recording (for example, a programme currently being shown).

☐ If you want to start and stop a recording manually, read the section: 'Recording without automatic switch-off'.

☐ If you want to start a recording manually but have it stopped automatically, read the section: 'Recording with automatic switch-off'.

Recording without automatic switch-off

1 Insert a cassette.

2 Use the P+/–▲▼ button to select the programme number you want to record, for example, 'P01'.

▷ Programme number 'E1' is provided for recording from external sources (via the EXT.1 scart socket).

3 To start recording, press the RECORD/OTR● button on the remote control or ◉ on the TV-VIDEO Combi.
When you are recording, the red recording light at the front of the TV-VIDEO Combi will be alight.

4 Stop recording with the STOP■ button.

▷ During a recording you can watch other TV channels.

▷ To switch off the screen, press the STANDBY⏻ button.

Recording with automatic switch-off (OTR one-touch-recording)

1 Put a cassette in the machine.

2 Use the P+/–▲▼ button to select the programme number you want to record.

3 Press the RECORD/OTR● button on the remote control.
When you are recording, the red recording light at the front of the TV-VIDEO Combi will be alight.

4 Press the RECORD/OTR● button again and again until the display on the TV-VIDEO Combi shows the desired end time or length of the recording.

▷ To cancel this information, press the CLEAR button.

5 Confirm with the OK button.

6 To end, press the MENU button.

Protecting your recordings

So that you don't accidentally delete an important recording, remove the special tab on the narrow side of the cassette with a screwdriver or slide the special tab to the left. Later, if you no longer want to protect your recording, you can seal the gap again with sticky tape or slide the special tab to the right.

Auto-assembling

You can use the auto-assembling function to join individual recordings without any major picture disturbance between them.

1. While the cassette is playing, search for the correct position on the tape.

2. Stop the cassette by pressing the [STOP■] button. '`Pause`' will appear on the TV screen.

3. Now start recording as usual by pressing the [RECORD/OTR●] button on the remote control.

Selecting the recording speed (SP or LP)

You can reduce the recording speed by half. This makes it possible to record, for example, eight-hours instead of four-hours on an 'E240' (four-hour) cassette.

1. Press the [MENU] button. The main menu appears.

2. Select the line '`Tape`' with the [▲P+] or [P−▼] button, and confirm with the [⊿+▶] button.

3. Select the line '`Tape speed`' with the [▲P+] or [P−▼] button.

4. Select the required recording speed with the [◀⊿−] or [⊿+▶] button.

   '`LP`': **L**ong **P**lay = half recording speed (double recording time).
   '`SP`': **S**tandard **P**lay = normal recording speed.

   The picture quality will be adversely affected when recording at half recording speed ('LP').

   For playback, the correct recording speed will automatically be selected.

5. Confirm with the [OK] button.

6. To end, press the [MENU] button.

7. PROGRAMMED RECORDING (TIMER)

Use programmed recording to automatically start and stop a recording at a later date.

To make a programmed recording, your TV-VIDEO Combi needs to know:

* the date you want to make the recording;
* the programme number for the TV channel you want to record;
* the start and stop time of the recording;
* whether you want to use VPS or PDC;
* the recording speed (SP/LP).

The TV-VIDEO Combi stores all the information in a TIMER block. You can programme up to 6 TIMER blocks a month in advance.

'VPS' (Video Programming System) and 'PDC' (Programme Delivery Control)

With 'VPS and PDC', the TV station controls the start time and the length of the recording. This means that the TV-VIDEO Combi switches itself on and off at the **right time** even if a TV programme you want to record begins earlier or finishes later than expected.
Usually the start time is the **same** as the VPS or PDC time. But if your TV guide gives a VPS or PDC time which is different to the programme's start time (for example, 20.15 and VPS 20.14), you must enter '20.14' as the start time.
If you want to programme a time that is different from the VPS or PDC time, you must switch off VPS or PDC.

Programming a recording (with 'VIDEOplus')

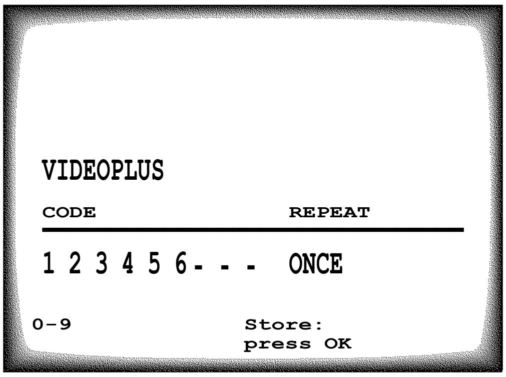
All the information required for a programming is contained in the PlusCode-programming number.

VIDEO Plus+®

1 Press the TIMER ◴ button on the remote control.

2 Select the line '`Videoplus`' with the buttons ▲P+ or P−▼ and confirm with the ⊿+▶ button.

3 Enter the entire PlusCode-programming number (up to 9 digits) printed in your TV guide next to the start time of a TV programme.
For example, 5-234-89 or 5 234 89
Enter 523489 for the PlusCode-programming number.
If you make a mistake, you can clear your instructions with the CLEAR button.



VIDEOPLUS

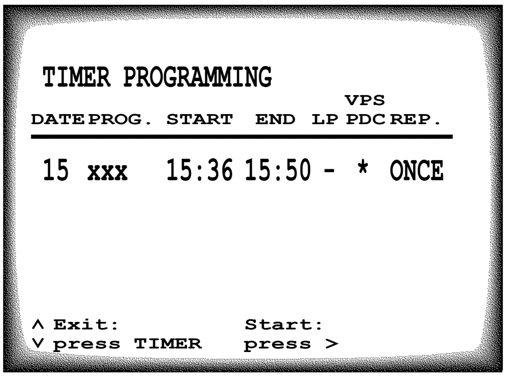
CODE REPEAT

1 2 3 4 5 6- - - ONCE

0-9 Store: press OK

4 In line '`REPEAT`' select daily or weekly programming with the ▲P+ or P−▼ button.
'`Mo-Fr`': If you want to make a recording every day from Monday to Friday.
'`Mo-Su`': If you want to make a recording every day from Monday to Sunday.
'`WEEKLY`': If you want to make a recording every week on the same day of the week.
'`ONCE`': If you want to make only one recording.

5 Confirm with the OK button. Your programming details will then appear on the TV screen.



```
TIMER PROGRAMMING
                               VPS
DATE PROG.  START   END   LP PDC REP.
15  xxx   15:36 15:50  -   *   ONCE

^ Exit:            Start:
v press TIMER      press >
```

- If VIDEOPlus+ does not recognise the TV channel, '`P??`' will appear on the TV screen. Instead of '`P??`', you can select the programme number you want with the number buttons 0-9.
- If '`Code error`' appears on the TV screen, this means you entered an incorrect PlusCode number or the incorrect date. Correct your instructions or end with the TIMER ⏲ button.
- If '`Daily error`' appears on the TV screen, the date was incorrectly entered.
- Under '`VPS/PDC`', use the ▲P+ or P–▼ button to switch 'VPS or PDC' on or off.
- Under '`LP`', use the ▲P+ or P–▼ button to select the recording speed 'SP' or 'LP'.
- The TIMER lamp on the front of the set will light up when one or more of the TIMER blocks are occupied.
- When you are recording, the red recording light at the front of the TV-VIDEO Combi will be alight.
- If the end of the cassette is reached during a recording, the TV-VIDEO Combi automatically ejects the cassette.
- If you forget to load a cassette, '`No cassette`' will appear.
- If you inserted a cassette with erase protection when you want to start a recording, the cassette will be ejected.

6 Press the OK button.

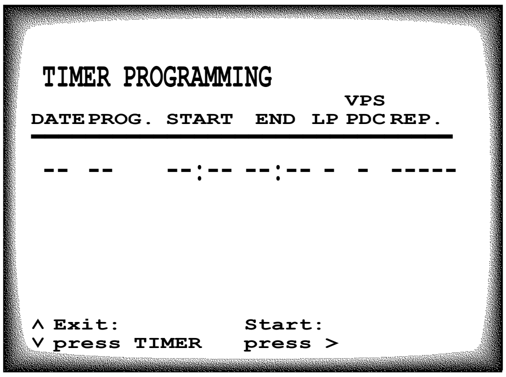
7 Confirm the message on the screen with the OK button. A TIMER recording can only start, if the set is not used for other video recorder functions (e.g. playback).

8 To end, press the TIMER ⏲ button.

Programming a recording (without 'VIDEOPlus')

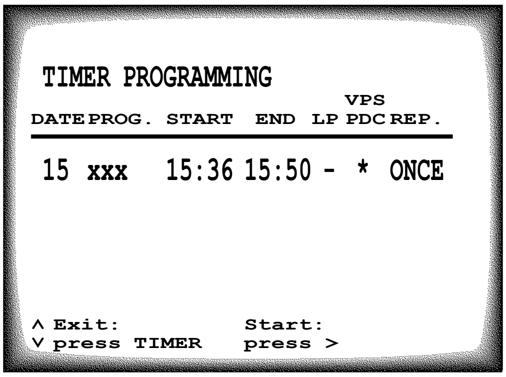
1 Press the TIMER ⏲ button on the remote control.

2 Select the line '`Timer programming`' with the buttons ▲P+ or P–▼ and confirm with the ⊿+▶ button.



```
TIMER PROGRAMMING
                               VPS
DATE PROG.  START   END   LP PDC REP.
--  --    --:-- --:-- -  -  -----

^ Exit:            Start:
v press TIMER      press >
```

3 Select a free TIMER block with the P+/–▲▼ button. Press the OK button.



```
TIMER PROGRAMMING
                               VPS
DATE PROG.  START   END   LP PDC REP.
15  xxx   15:36 15:50  -   *   ONCE

^ Exit:            Start:
v press TIMER      press >
```

4 Select the entry field with the ◀⊿– or ⊿+▶ button.

5 Enter information with the buttons ▲P+ or P–▼ or with the digit buttons 0-9.

- Under '`REP.`', use the ▲P+ or P–▼ button to select daily or weekly programming.
  '`Mo-Fr`': If you want to make a recording every day from Monday to Friday.
  '`Mo-Su`': If you want to make a recording every day from Monday to Sunday.
  '`WEEKL`': If you want to make a recording every week on the same day of the week.
  '`ONCE`': If you want to make only one recording.
- Under '`LP`', use the ▲P+ or P–▼ button to select the recording speed 'SP' or 'LP'.

Under '**VPS/PDC**', use the ▲P+ or P−▼ button to switch 'VPS or PDC' on or off.

6 Confirm with the OK button when the information is correct.

7 Confirm the message on the screen with the OK button. A TIMER recording can only start, if the set is not used for other video recorder functions (e.g. playback).

The programming information has been stored in a TIMER block.

8 To end, press the TIMER ◴ button.

9 Make sure that the cassette you have put in can be recorded on.

How to check or change a TIMER

1 Press the TIMER ◴ button on the remote control.

2 Select the line '**Timer programming**' with the buttons ▲P+ or P−▼ and confirm with the ⊿+► button.

3 Select the TIMER you want to check or change with the ▲P+ or P−▼ button and confirm with the OK button.

4 Select the entry field with the ◄⊿− or ⊿+► button.

5 Change any information with the ▲P+ or P−▼ button or with the 0-9 buttons.

Under '**LP**', use the ▲P+ or P−▼ button to select the recording speed 'SP' or 'LP'.

6 Confirm with the OK button.

7 To end, press the TIMER ◴ button.

8 Make sure that the cassette you have put in can be recorded on.

How to clear a TIMER

1 Press the TIMER ◴ button on the remote control.

2 Select the line '**Timer programming**' with the buttons ▲P+ or P−▼ and confirm with the ⊿+► button.

3 Select the TIMER you want to clear with the buttons ▲P+ or P−▼.

4 Press the CLEAR button.

5 Switch off with the TIMER ◴ button.

8. ADDITIONAL FUNCTIONS

How to read TELETEXT

☐ Press the TELETEXT ⊜ button to switch the TXT decoder on and off. The TV-VIDEO Combi is now receiving the TXT of the TV channel currently selected.

☐ To store the current page, press the OK button.
The next time you call up TELETEXT, you will automatically turn to this page.

☐ If you want to select an other page, type in the number of the page with the digit buttons 0-9 . With the colour buttons on your remote control you can directly select the page numbers/chapters shown at the bottom of the TV screen.

Extra TELETEXT functions

To use the extra TELETEXT functions, press the MENU button, when you are in TELETEXT.

☐ To enlarge the print, select the symbol '⊜' and confirm with the OK button.

☐ To switch off the TELETEXT decoder temporarily, select the symbol '⊠' and confirm with the OK button.

☐ To call up a TELETEXT sub-page:

  1 Select the symbol '○' and confirm with the OK button.

  2 Enter the page number of the sub-page with the 0-9 -buttons (for example: 0123).

☐ To call up concealed information, select the symbol '?' and confirm with the OK button.

☐ To stop the pages from being turned over, select the symbol '⊜' and confirm with the OK button.

☐ To show TELETEXT transparently, select the symbol '⊡' and confirm with the OK button.

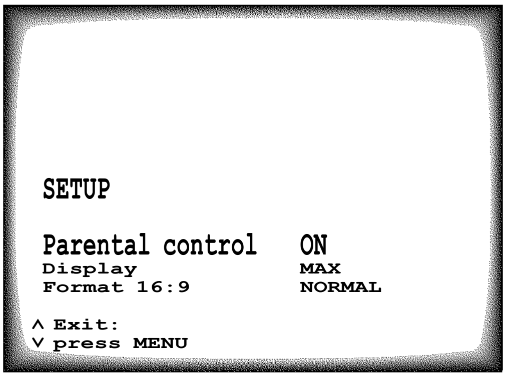
Parental control

This function will prevent unauthorised use of your TV-VIDEO Combi. All button-functions will be locked.

ⓘ You can make programmed recordings while the parental control is on.

1 Press the MENU button. The main menu will appear.

2 Select the line '`Setup`' with the ▲P+ or P–▼ button and confirm with the ⊿+▶ button.



SETUP

Parental control ON
Display MAX
Format 16:9 NORMAL

∧ Exit:
∨ press MENU

3 In the line '`Parental control`' select '`ON`' with the ◀⊿– or ⊿+▶ button.

4 Confirm with the OK button.

5 To end, press the MENU button.
Keep the remote control in a safe place.

6 If you want to switch off the parental control, select '`OFF`' in line '`Parental control`'.

  ⓘ If a button is pressed with activated parental control, '`Parental Control active`' will appear in the display.

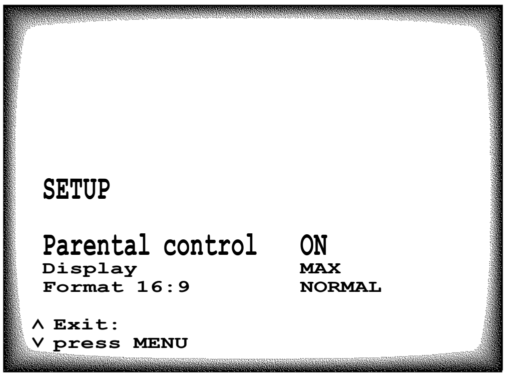
  ⓘ If you want to eject a cassette with activated parental control, press the STOP■ button several seconds.

Switching the On-screen display (OSD) on or off

You can switch the On Screen Display of the current operating information on or off.

1 Press the MENU button. The main menu will appear.

2 Select the line '**Setup**' with the buttons ▲P+ or P−▼ and confirm with the ⊿+▶ button.



```
SETUP

Parental control   ON
Display            MAX
Format 16:9        NORMAL

∧ Exit:
∨ press MENU
```

3 Select the line '**Display**' with the buttons ▲P+ or P−▼.

4 Select one of the options indicated with the buttons ⊿+▶ or ◀⊿−.
'**MAX**': OSD appears for a few seconds each time an operating mode is selected and then disappears.
'**MIN**': OSD is minimised.
'**PROGR.**': the programme number is constantly indicated.
'**COUNTER**': the counter is constantly indicated.

5 Confirm with the OK button.

6 To end, press the MENU button.

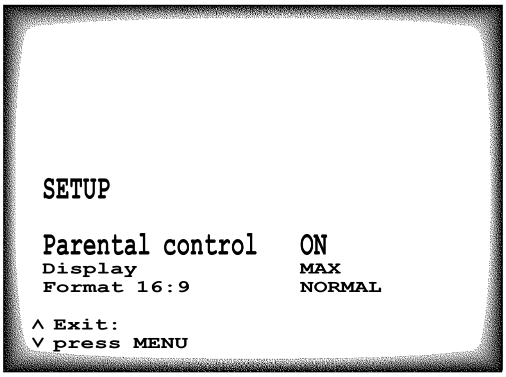
ⓘ You can use the OK button to show the current operating mode on your TV screen.

Switching to 16:9 wide screen picture

If you are using a cassette with 16:9 wide screen recordings, you can switch this function 'ON'. The TV-VIDEO Combi will now automatically switch to wide screen.

1 Press the MENU button. The main menu appears.

2 Select the line '**Setup**' with the ▲P+ or P−▼ button and confirm with the ⊿+▶ button.



```
SETUP

Parental control   ON
Display            MAX
Format 16:9        NORMAL

∧ Exit:
∨ press MENU
```

3 Select the line '**Format 16:9**' with the P−▼ or ▲P+ button.

4 Select one of the possibilities with the ⊿+▶ or ◀⊿− button.
'**NORMAL**': Normal size picture.
'**EXTEND.**': Extended size picture.
'**COMPR.**': 16:9 format picture.

ⓘ When you watch TV you can select between '**EXTEND.**' and '**NORMAL**'.

5 Confirm with the OK button.

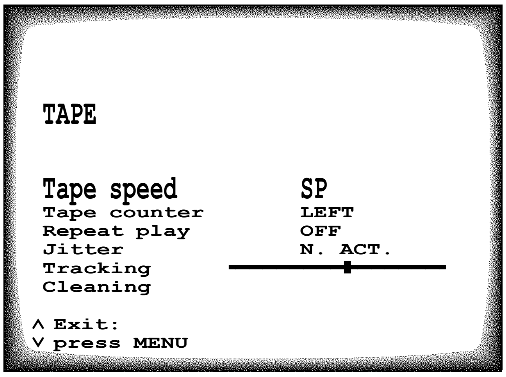
6 To end, press the MENU button.

Continuous playback

You can automatically play a cassette again and again. When the end of the tape or the recording has been reached, it will rewind and start again.

1 Press the MENU button. The main menu will appear.

2 Select the line '**Tape**' with the buttons ▲P+ or P–▼. Confirm with the menu buton ⊿+▶.



```
TAPE

Tape speed          SP
Tape counter        LEFT
Repeat play         OFF
Jitter              N. ACT.
Tracking
Cleaning

^ Exit:
v press MENU
```

3 Select the line '**Repeat play**' with the buttons ▲P+ or P–▼.

4 Select '**ON**' with the buttons ◀⊿– or ⊿+▶. If you select '**OFF**', the function will be switched off.

5 Confirm with the OK button.

6 Press the MENU button.

Switch off function (SLEEP TIMER)

You can programme your set to switch off after a predetermined period.

1 Press the TIMER ⏻ button on the remote control.

2 Select line '**Sleep timer**' with the ▲P+ or P–▼ button and confirm with the ⊿+▶ button.

3 Determine the time left until switch off in 15 minutes intervals, using the ▲P+ or P–▼ button.

ⓘ You can switch the function off with the CLEAR button on the remote control.

4 Confirm with the OK button.

5 To end, press the TIMER ⏻ button.

Switch on function (WAKE-UP TIMER)

You can programme your set to switch on at a predetermined time.

1 Press the TIMER ⏻ button on the remote control.

2 Select line '**Wake-up timer**' with the ▲P+ or P–▼ button and confirm with the ⊿+▶ button.

3 Select the entry field with the ◀⊿– or ⊿+▶ button.

4 Enter the information with the ▲P+ or P–▼ button or with the number buttons 0-9.

5 In the line '**ON**', switch the function on or off.

6 Confirm with the OK button.

7 To end, press the TIMER ⏻ button.

9. Before you call an engineer

If you have any problems using this TV-VIDEO Combi, it may be caused by one of the reasons mentioned below. You can also call the **customer service centre** in your country.
You will find the phone number in the enclosed guarantee leaflet.

Your TV-VIDEO Combi does not respond to any button being pressed:

- There is no power supply: check the power supply
- A programmed recording is currently being made: cancel the programmed recording with the STANDBY ⏻ button.
- Parental control is on: switch off the parental control.
- Continuous playback is on: switch off the continuous playback.
- There is a technical problem: switch off the mains power supply for 30 seconds, then switch it on again.

Cassette is jammed in the TV-VIDEO Combi:

- Don't use force. Switch off the mains power supply for 30 seconds, then switch it on again.

Remote control does not work:

- Remote control not pointed toward the TV-VIDEO Combi: point it at the TV-VIDEO Combi.
- Batteries have run out: change the batteries.

No picture when you play a cassette:

- There is no recording on the cassette: change the cassette.

Poor picture quality when you play a cassette:

- The cassette badly worn or of poor quality: use new cassette.
- Tracking is not properly adjusted or the video heads are dirty: turn to chapter 'PLAYBACK FUNCTIONS' and read the section 'Picture interference'.
- You are playing a cassette with a LongPlay recording on it: Excellent picture quality is only guarateed with recordings made in StandardPlay recording speed.

The TV-VIDEO Combi will not record:

- The TV channel you want to record is not stored or you selected the wrong programme number: check TV channels stored.
- You have loaded a cassette which cannot be recorded on: undo the erase protection on the cassette.

Programmed recording does not work:

- You have not set the TIMER properly: check the TIMER blocks.
- You have programmed the wrong time or date: check time and date.
- You have put in a cassette that cannot be recorded on: undo the erase protection on the cassette.
- 'PDC' or 'VPS' switched on but 'PDC/VPS time' wrong: enter PDC or VPS time exactly to the minute. Have the aerial checked.

'Smart Clock' setting does not work:

- You have stored a TV channel on programme number 'P01' that does not transmit TELETEXT: On 'P01' store a TV channel that transmits TELETEXT.
- Poor TELETEXT reception: On 'P01' store a TV channel with good TELETEXT reception.
- You have not activated the Smart Clock function: Switch the function 'ON'.

You hear a very short and soft noise coming from your TV-VIDEO Combi at 3:00 at night:

- 'Smart Clock' is checking the time: Switch off the Smart Clock function.

TELETEXT does not start at page 100:

- You have stored a different preferred page: Store page 100 as preferred page.

Technical terms used

Current tape position : The part of the tape currently being played.
External source : A device connected via a socket (for example, scart socket) which is transmitting audio/video signals to the TV-VIDEO Combi.
Index marking : A marking which is automatically made on the tape at the beginning of every recording. This marking (recording ID) can be searched for with the Index search function.
Scart cable : Also known as a Euro-AV cable. This standard cable is an easy method of connecting various TV, audio and video devices, such as a HIFI and Dolby Surround set, video recorder, DVD player, SAT receiver, decoder, computer and similar devices. Other signals in addition to audio and video signals can be transmitted on it.
TV system : There are various systems for transmitting television signals, for example, PAL, SECAM, PAL BG, SECAM DK, SECAM L/L, NTSC etc. The system used by your television depends on which country you are in.
TXT : Also known as Teletext, Fasttext, Videotext, FLOF etc.
OTR : One touch recording. This function enables you to select the switch-off time in intervals of 30 minutes.

14PV320/05

3103 166 23501
9324/011

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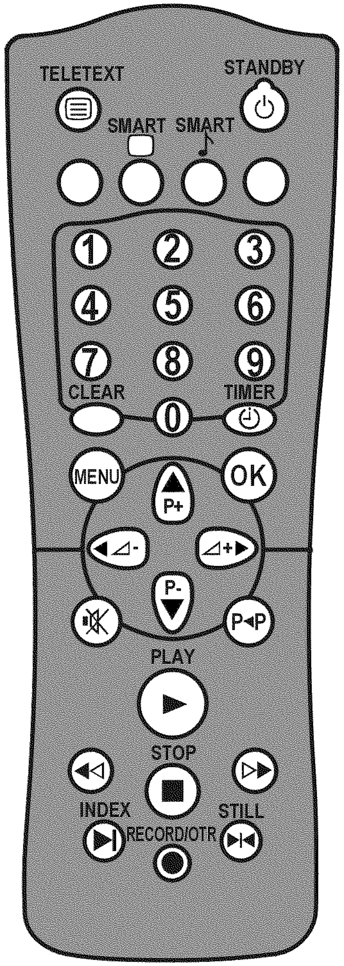
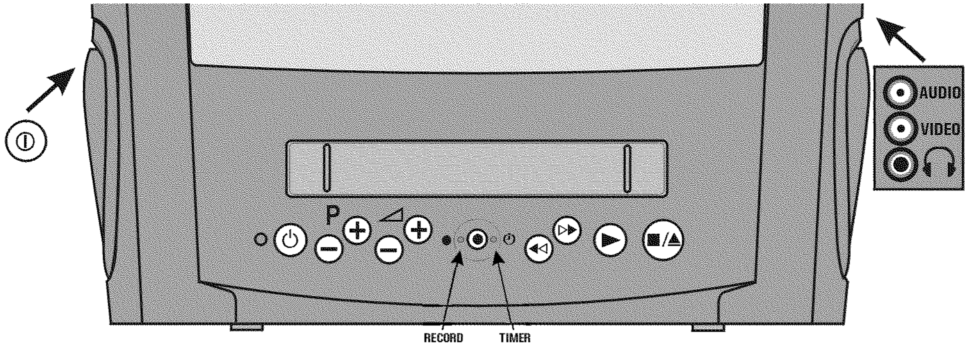
OPERATING INSTRUCTIONS IN BRIEF

The remote control



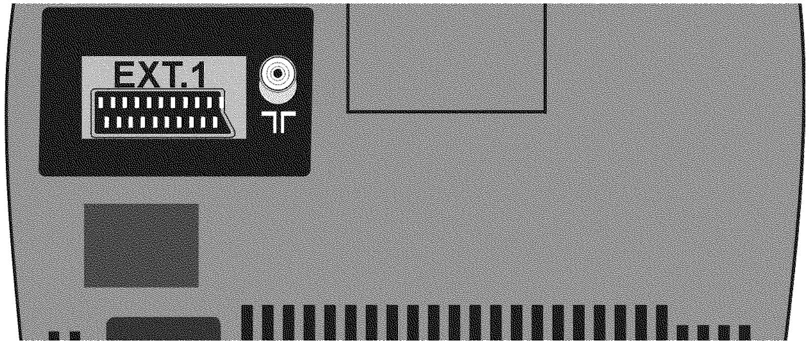
TELETEXT ▤	**TELETEXT**: To switch TELETEXT on or off
STANDBY ⏻	**Switch off** : To switch off set, interrupt menu function, interrupt a programmed recording (TIMER)
0-9	**Number buttons**: 0 - 9
CLEAR	**Delete**: To delete last entry or clear programmed recording (TIMER)
TIMER ⏲	**TIMER**: To make a manual TIMER programming or to alter or clear a programmed TIMER
MENU	**Menu** : To call up or end main menu
OK	**Store/Confirm**: To store or confirm entry
P +/– ▲▼	**Programme number**: To select a programme number up or down
▲P +	**Select**: One line up
P – ▼	**Select**: One line down
⊿ +/– ◀▶	**Volume**: To regulate the volume
◀ ⊿ –	**Select**: Cursor left
⊿ + ▶	**Select**: Cursor right
🔇	**Volume off**: To switch the volume on or off
P◀P	**Previous programme number**: To select the previous programme number
PLAY ▶	**Playback**: To play a recorded cassette
◁◀	**Rewind**: During STOP and STANDBY: rewind, during PLAYBACK: reverse scanning
STOP ■	**Pause/Stop**: To stop the tape, except while a TIMER-recording is being made
▶▷	**Forward wind**: During STOP and STANDBY: forward wind, during PLAYBACK: forward scanning
INDEX ▶|	**Index search**: In combination with ◁◀ / ▶▷ : to search for previous/next recording on the cassette.
RECORD/OTR ●	**Record**: To record the programme selected
STILL ▶|◀	**Still picture**: To stop the tape and show a still picture
	Coloured TELETEXT-buttons: To select TELETEXT pages directly
(red)	Select page/chapter shown in red at the bottom of the screen
(green)	Select page/chapter shown in green at the bottom of the screen
(yellow)	Select page/chapter shown in yellow at the bottom of the screen
(blue)	Select page/chapter shown in blue at the bottom of the screen

Front of the set



⦶	**Power switch** : To switch off the set **Beware:** If you switch the set off with the power switch ⦶ , TIMER-recordings are not possible!
⏻	**Standby** : To switch off, interrupt a function, interrupt a programmed recording (TIMER)
P +/−	**Programme number** : To select programme number up or down
◿ +/−	**Volume**: To regulate the volume
◉	**Record**: To record the programme selected
◁◀	**Rewind** : During STOP and STANDBY: rewind, during PLAYBACK: reverse scanning
▶▷	**Forward wind**: During STOP and STANDBY: forward wind, during PLAYBACK: forward scanning
▶	**Playback** : To play a recorded cassette
■/▲	**Pause/Stop, eject cassette**: To stop the tape and during STOP eject the cassette
AUDIO	**Audio input socket**
VIDEO	**Video input socket** : To connect a camcorder or videogames
🎧	**Headphones socket**: To connect headphones

Back of the set



EXT.1	**Scart socket**: To connect a satellite receiver, decoder, video recorder, etc.
⊤⊤	**Aerial input socket**: To connect the aerial cable

OPERATING INSTRUCTIONS PHILIPS 14PV210/07

Congratulations! You now own one of the most sophisticated and simple-to-use TV-VIDEO Combinations on the market. With this TV-VIDEO Combi you can record and play VHS-standard cassettes.

VHS

Please take the time to read this operating manual before using your TV-VIDEO Combi.

Safety instructions and other notes

⚠ **Danger: High voltage!**
Do not remove the top cover as there is a risk of an electrical shock!

⚠ The TV-VIDEO Combi does not contain any components that can be repaired by the customer. To switch off the TV-VIDEO Combi completely you must switch it off with the power switch ⏻.

⚠ Make sure that air can circulate freely through the ventilation slots on the TV-VIDEO Combi.

⚠ Make sure that no objects or liquids enter the TV-VIDEO Combi. If liquid is spilt into it, disconnect the TV-VIDEO Combi immediately from the power supply and call the After-sales Service for advice.

⚠ The TV-VIDEO Combi should **not be used immediately after transportation** from a cold to a hot area or vice versa, or in conditions of extreme humidity.
After unpacking the TV-VIDEO Combi, it should be allowed to **acclimatize for at least three hours** before installation.

♻ These operating instructions have been printed on nonpolluting paper.

♻ Deposit old batteries at the relevant collection points.

♻ Please make use of the facilities available in your country for disposing of the packaging of the TV-VIDEO Combi in a way that helps to protect the environment.

♻ This electronic equipment contains many materials that can be recycled. Please inquire about the possibilities for recycling your old set.

ℹ VIDEOPlus+ and PlusCode are registered trademarks of Gemstar Development Corporation. The VIDEOPlus+ system is manufactured under licence from Gemstar Development Corporation.

VIDEO Plus+®

So that you can identify your machine in the event of theft, enter the serial number (PROD.NO) here. The serial number is printed on the type plate fixed at the rear of the set.

MODEL NO. **14PV210/07**

PROD.NO:......

This product complies with the requirements of the Directive 73/23/EEC + 89/336/EEC + 93/68/EEC.

Technical information

Measurements in cm (W / H / D): 39.2 / 40.7 / 39.8
Power consumption (Standby) : less than 45W (less than 4W)
Voltage : 198-264V 50Hz
Headphones : Output resistance less than 120 Ohms maximum output voltage more than 2.6V at 120 Ohms

Emergency interrupt

You can use the STANDBY ⏻ button on the TV-VIDEO Combi or the remote control to interrupt any function. If you want to interrupt a running Timer recording, hold the STANDBY ⏻ button for several seconds.
So if you are having operating problems, you can just interrupt the function and start again.
And you can practise operating your set without any worries. No matter which buttons you press, you cannot damage it.

Special functions on your TV-VIDEO Combi

SmartClock	If a television programme, which transmits TELETEXT, is stored with programme number 'P01', time and date will be set automatically.
Plug & Play	When you have plugged your TV-VIDEO Combi into the mains, you will be welcomed with an OSD picture. All you have to do is follow the instructions in the "intelligent help line" for the next step. Enjoy the Automatic TV channel search/save function and the automatic time adjustment.
AVL	Automatic Volume Leveller. It minimises sudden changes in TV volume when commercial spots are transmitted.
Digital Studio Picture Control	Philips has developed a system which produces the best possible playback quality. It reduces disturbance on old, worn video cassettes, and emphasises the detail on very good quality cassettes.
VIDEO Plus+®	Simple programming system for TV-VIDEO Combis. Makes programming as easy as making a telephone call. Simply enter the programme code which you will find in your listings magazine.
2000✓	We guarantee that your TV-VIDEO Combi will switch to the new millennium with no problems whatsoever.

1. CONNECTING YOUR TV-VIDEO COMBI

Important for the United Kingdom

This machine is fitted with an approved moulded 13 Amp plug. To change a fuse in this type of plug, please follow these instructions.

1 Take off the fuse cover and take out the fuse.

2 Put in a new fuse which should be a BS1362 3A, A.S.T.A. or BSI approved type.

3 Refit the fuse cover.

If the plug fitted is not suitable for your socket, cut it off and fit another type.
If the plug you fit contains a fuse, it should be a 3Amp fuse. If you fit a plug which does not need a fuse, make sure the fuse on your fuse box is not greater than 5 Amps.

Note: Please destroy the plug you have cut off so that it cannot be used in a 13 Amp socket somewhere else.

How to connect a plug
The wires in the lead from the video recorder are coloured as follows.
* Blue - 'neutral' ('N').
* Brown - 'live' ('L').

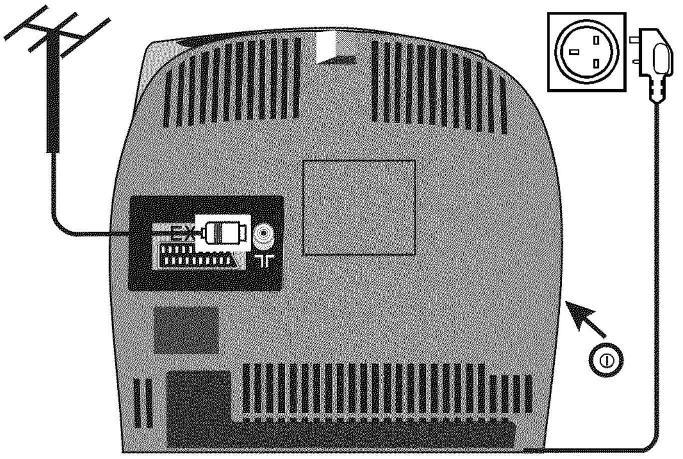
4 Connect the blue wire to the terminal in the plug which is marked with the letter 'N' or coloured black.

5 Connect the brown wire to the terminal in the plug which is marked with the letter 'L' or coloured red.

6 Do not connect either of the wires to the terminal in the plug which is marked with the letter 'E', the symbol ⏚ or coloured green or green and yellow.

Before you refit the plug cover, make sure that the grip at the bottom of the plug is clamped over the plastic cover of the lead, not just over the two wires.

Connecting the cables



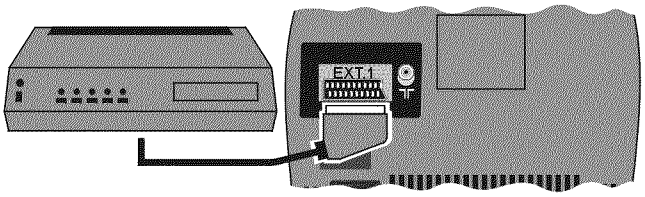
1 Insert the aerial plug into the ⊤⊤ socket.

2 Insert the plug of the mains cable into the wall socket.

3 If the little red light at the front of the set is not alight, please switch on the set. The power switch ⏻ is located on the left side panel of the set.

Connecting a decoder or other equipment

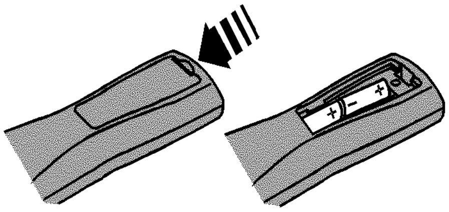
You can also connect additional equipment to the EXT.1 socket. For instance, a satellite receiver, decoder or camcorder.



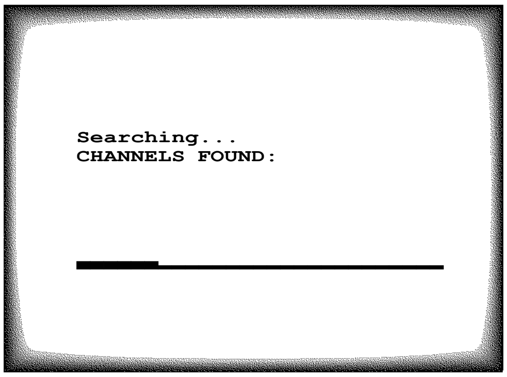
2. INSTALLING YOUR TV-VIDEO COMBI

Initial installation

1. Open up the battery compartment of your remote control and place the batteries in it as shown in the picture.



2. Close the battery compartment.
3. If you have connected the aerial to the TV-VIDEO Combi, press the OK button.
   'Automatic TV channel search' starts. This picture will appear on the screen:



```
Searching...
CHANNELS FOUND:
```

Wait until all TV channels have been found. This can take several minutes.

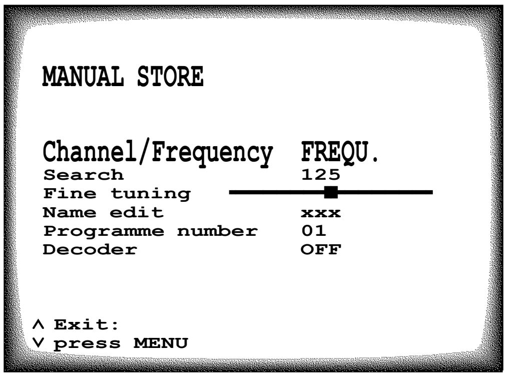
> If you have connected a decoder, you must install it as described in the next section.

> If you have connected a satellite receiver, please read the section 'satellite receiver'.

Allocating a decoder

Some TV stations will send coded TV channels, that you can only watch when you use a decoder. You can connect such a decoder (descrambler) to your TV-VIDEO Combi. With the following function, the connected decoder will automatically be activated for the TV programme you want to watch.

1. Choose the TV channel on which you wish to use the decoder with the P+/–▲▼ button on the TV-VIDEO Combi or the number buttons 0-9 on the remote control.
2. Press the MENU button on the remote control. The main menu will appear.
3. Select the line '`Installation`' with the P–▼ or ▲P+ buton and confirm with the ⊿+▶ button.
4. Select the line '`Manual store`' with the P–▼ or ▲P+ button and confirm with the ⊿+▶ button.
5. Select the line '`Decoder`' with the P–▼ or ▲P+ button.



```
MANUAL STORE

Channel/Frequency  FREQU.
Search             125
Fine tuning      ─────■────
Name edit          xxx
Programme number   01
Decoder            OFF


^ Exit:
v press MENU
```

6. Select function '`ON`' with the ◀⊿– or ⊿+▶ button. When you select '`OFF`', the function will be switched off.
7. Confirm with the OK button.
8. To end, press the MENU button.
   Your decoder has now been allocated to this TV channel.
9. Press the MENU button again.

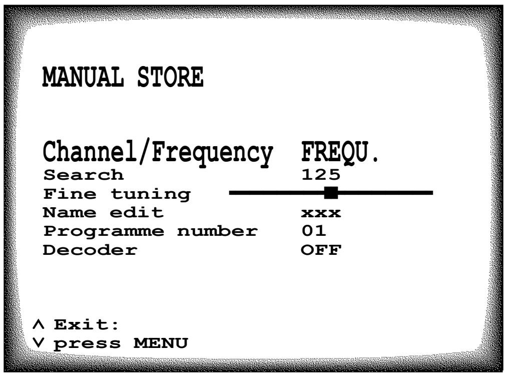
Manual TV channel search

In certain cases the 'Automatic TV channel search' may not be able to find all of the TV channels (e.g. coded TV channels). In that case, use this manual method to set the channels.

1 Press the MENU button on the remote control. The main menu will appear.

2 Select the line '`Installation`' with the P–▼ or ▲P+ button and confirm with the ⊿+► button.

3 Select the line '`Manual store`' with the P–▼ or ▲P+ button and confirm with the ⊿+► button.



```
MANUAL STORE

Channel/Frequency   FREQU.
Search              125
Fine tuning     ─────■─────
Name edit           xxx
Programme number    01
Decoder             OFF

^ Exit:
v press MENU
```

4 In the line '`Channel/Frequency`', select the display for:
'`FREQU.`': frequency
'`C CH`': channel
'`S CH`': special channel

5 If you know the frequency or channel of the desired TV channel, you can enter the data in line '`Search`' with the digit buttons 0-9.

▷ If you don't know the frequency or channel of the TV channel of your choice, press the ⊿+► button to start the channel search.

6 In the line '`Programme number`' select the programme number you want e.g.: '`01`', using the ◄⊿– or ⊿+► button.

7 If you want to change the TV channel name, press the ⊿+► button in line '`Name edit`'.

☐ Select the letter or number you want to change with the ◄⊿– or ⊿+► button. Change it with the P–▼ or the ▲P+ button. Select the next letter or number in the same way.

8 Press the OK button to store the changes you have made.

9 If you want to change the automatic tv channel setting, select the line '`Fine tuning`'.
With the ◄⊿– or ⊿+► button you can vary the automatic tv channel setting. **Important:** This re-tuning is only necessary and useful in **special cases**, e.g.: when there are stripes on the picture with cable-TV systems.

10 Press the OK button to store the TV channel.

▷ If you want to search for further TV channels, start again at step 5.

11 To end, press the MENU button.

Satellite receiver

You can receive channels from the satellite receiver via the scart socket EXT.1.
To do this, select the channel number '`E1`' with the P+/–▲▼ button. You will have to select the channels to be received by the satellite receiver on the receiver itself.

Special installation functions

You can select one of the following installation functions in order to adapt the TV-VIDEO Combi to your own specific requirements.

Automatic TV channel search

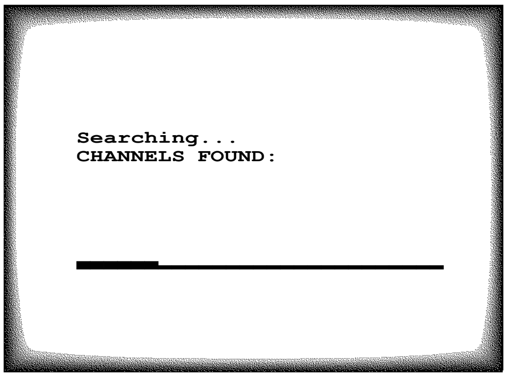
Your TV-VIDEO Combi will search for all TV channels.
If you want to start the automatic TV channel search again, then follow the instructions below.

1 Press the MENU button on the remote control. The main menu will appear.

2 Select the line '`Installation`' with the P−▼ or ▲P+ button and confirm with the ⊿+▶ button.

3 Select the line '`Autoinstall`' with the P−▼ or ▲P+ button.

4 Press the ⊿+▶ button. The 'Automatic TV channel search' starts.



```
Searching...
CHANNELS FOUND:
```

5 When the TV channel search is complete, '`Installation comp.`' will appear on the screen.

How to search for a TV channel manually, you can read in the section 'Manual TV channel search'.

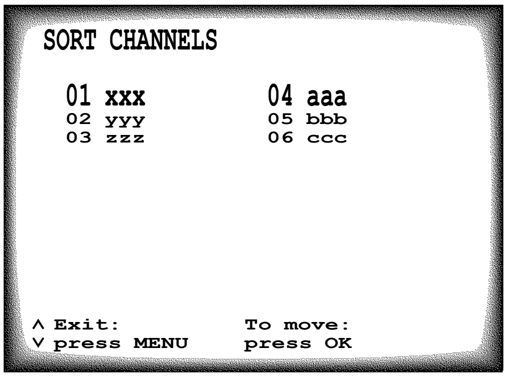
Automatic Channel Installation:
Some cable companies or broadcasters offer the possibility to install TV channels automatically with 'ACI'. Information about the installation offered and how to select it, will appear on the screen.
This set will recognize and install TV channels with 'ACI' automatically.
TV channels will be stored from programme number 1 onward.
If 'ACI' cannot identify a TV channel, you can search for it using the method as described in the section 'Manual TV Channel Search'.

Channel Number Allocation

1 Press the MENU button. The main menu will appear.

2 Select the line '`Installation`' with the buttons P−▼ or ▲P+ and confirm with the button ⊿+▶.

3 Select the line '`Sort channels`' with the buttons P−▼ or ▲P+ and confirm with the button ⊿+▶.



```
SORT CHANNELS

  01 xxx          04 aaa
  02 yyy          05 bbb
  03 zzz          06 ccc


∧ Exit:           To move:
∨ press MENU      press OK
```

4 With the buttons P−▼, ▲P+, ◀⊿− or ⊿+▶, select the TV channel to which you want to allocate a programme number and press the OK button.

5 With the buttons P−▼, ▲P+, ◀⊿− or ⊿+▶, shift the TV channel to the programme number you wish to allocate to this TV channel and press the OK button.

6 Repeat steps 4 to 5 until you have allocated a programme number to all the required TV channels.

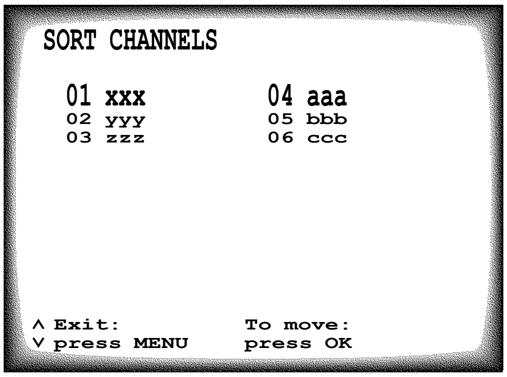
7 To end, press the MENU button.

Delete a TV Channel

1 Press the MENU button. The main menu will appear.

2 Select the line '**Installation**' with the buttons P−▼ or ▲P+ and confirm with the button ⊿+▶.

3 Select the line '**Sort channels**' with the buttons P−▼ or ▲P+ and confirm with the button ⊿+▶.



```
SORT CHANNELS

  01 xxx          04 aaa
  02 yyy          05 bbb
  03 zzz          06 ccc




^ Exit:          To move:
v press MENU     press OK
```

4 With the buttons P−▼, ▲P+, ◀⊿− or ⊿+▶, select the TV channel you want to delete and press the CLEAR button.

5 Repeat step 4, until you have deleted all the required TV channels.

6 To end, press the MENU button.

Setting the language

You can select the language for the on-screen display (OSD).

1 Press the MENU button on the remote control. The main menu will appear.

2 Select the line '**Installation**' with the P−▼ or ▲P+ button and confirm with the ⊿+▶ button.

3 Select the line '**Language**' and confirm with the ⊿+▶ button.

4 Select your language with the P−▼ or ▲P+ button.

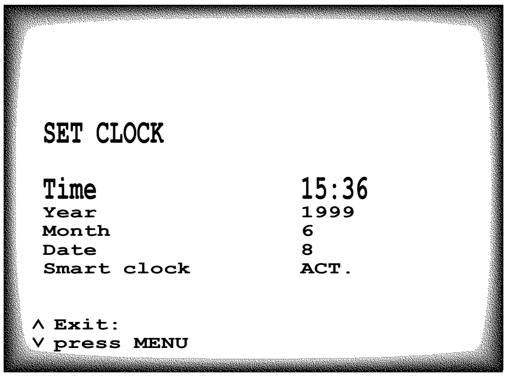
5 To end, press the MENU button.

Setting the time and date

1 Press the MENU button on the remote control. The main menu will appear.

2 Select the line '**Installation**' with the buttons P−▼ or ▲P+ and confirm with the button ⊿+▶.

3 Select the line '**Set clock**' with the P−▼ or ▲P+ button and confirm with the ⊿+▶ button.



```
SET CLOCK

Time               15:36
Year               1999
Month              6
Date               8
Smart clock        ACT.

^ Exit:
v press MENU
```

4 Check the time in line '**Time**'. If required, please change the time with the 0-9 buttons on the remote control.

5 Check '**Year**', '**Month**' and '**Date**' in the same way. You can switch between entry fields with P−▼ or ▲P+ button. Confirm with the OK button.

6 To end, press the MENU button.

Automatic clock and date setting (SMART CLOCK)

If a TV programme, which transmits TELETEXT, is stored with programme number '`P01`', time and date will be set automatically.

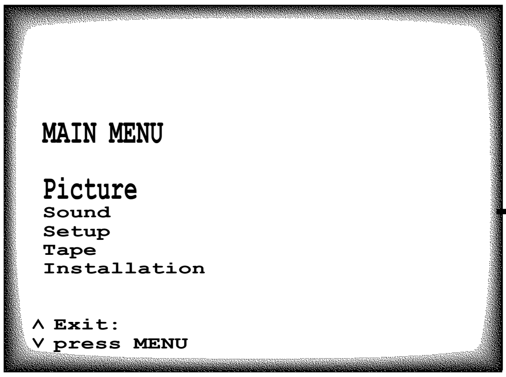
The clock will automatically be adjusted to winter time and summer time. Confirm with the OK button.

1. Press the MENU button on the remote control. The main menu will appear.
2. Select the line '`Installation`' with the buttons P−▼ or ▲P+ and confirm with the button ⊿+▶.
3. Select the line '`Set clock`' with the P−▼ or ▲P+ button and confirm with the ⊿+▶ button.
4. Select the line '`Smart clock`' with the buttons P−▼ or ▲P+.
5. Switch the function on with the buttons ◀⊿− or ⊿+▶.
6. To end, press the MENU button.

3. IMPORTANT NOTES FOR OPERATION

SUMMARY OF USER GUIDE

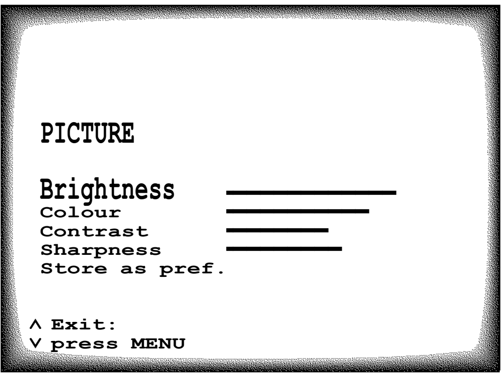
The OSD menu offers the following functions. More details on each can be found in the appropriate chapter.



MAIN MENU

Picture
Sound
Setup
Tape
Installation

∧ Exit:
∨ press MENU

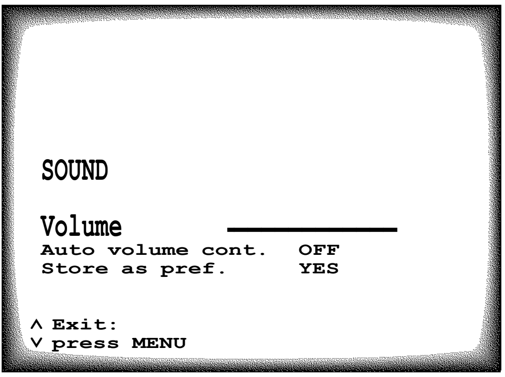


PICTURE

Brightness
Colour
Contrast
Sharpness
Store as pref.

∧ Exit:
∨ press MENU

Chapter: 'TV SET FUNCTIONS'

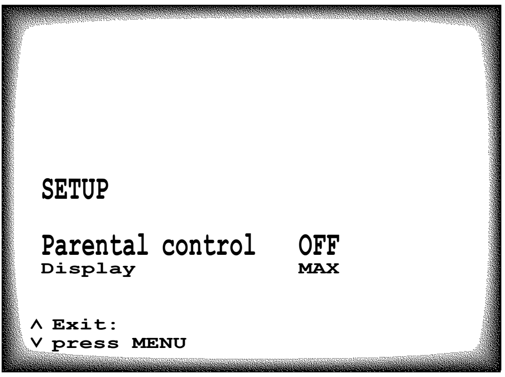


SOUND

Volume
Auto volume cont. OFF
Store as pref. YES

∧ Exit:
∨ press MENU

Chapter: 'TV SET FUNCTIONS'

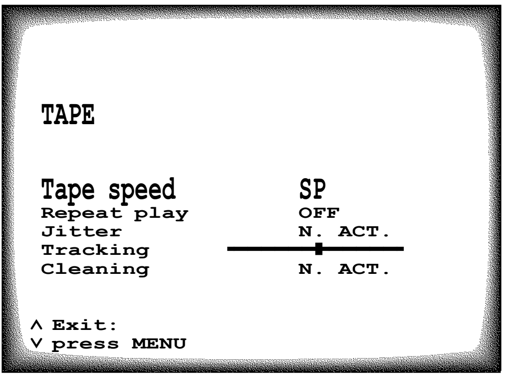


SETUP

Parental control OFF
Display MAX

∧ Exit:
∨ press MENU

Chapter: 'ADDITIONAL FUNCTIONS'



TAPE

Tape speed SP
Repeat play OFF
Jitter N. ACT.
Tracking
Cleaning N. ACT.

∧ Exit:
∨ press MENU

Chapter: 'PLAYBACK FUNCTIONS'

User guide (OSD)

The OSD (On-screen display) shows the various functions in the form of a menu on the television screen. You can then choose the settings you require. There is a summary of the menus on this page. The main button functions are displayed in a help line along the bottom of the screen.

☐ **To call up the menu:** With the [MENU] button.

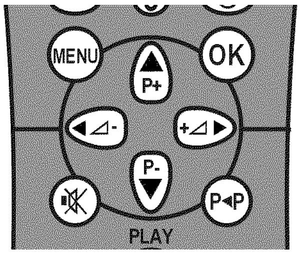
☐ **To select a line:** With the [◄⊿–] or [+⊿►] button.

☐ **To enter or change your selection:** With the [0-9], [◄⊿–] or [+⊿►] button.

☐ **To cancel:** With the [MENU] button.

☐ **To save or confirm:** With the [OK] button.

☐ **To close the menu:** With the [MENU] button.



☐ **To confirm the messages in red on the screen:** Press the [OK] button.

☐ You can switch the machine on with the [P+/–▲▼], [P◄P] or [0-9] button or by putting in a cassette.

4. TV SET FUNCTIONS

Selecting a TV programme

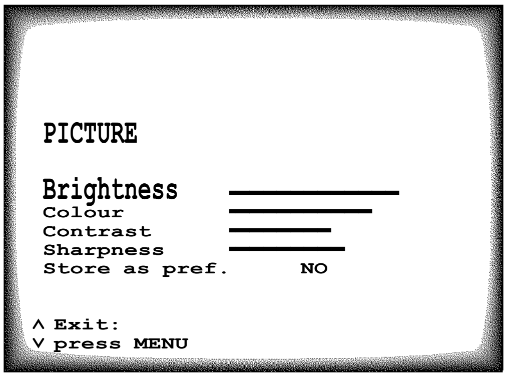
Select the required TV channel (=programme number) with the [P+/–▲▼] button or with the digit buttons [0-9] on the remote control.

ⓘ If you don't know the programme number of the required TV channel:

1. Press the [P+/–▲▼] button for more than 2 seconds. The TV channel list will appear on the screen.
2. Select the required TV channel with the [P+/–▲▼] button.
   After 1 second the TV-VIDEO Combi will switch to the selected programme number.

Picture settings

1. Press the [MENU] button. The main menu will appear.
2. Select the line '`Picture`' with the buttons [P–▼] or [▲P+] and confirm with the button [⊿+▶].



PICTURE

Brightness
Colour
Contrast
Sharpness
Store as pref. NO

^ Exit:
v press MENU

3. Select the required line with the buttons [P–▼] or [▲P+] and alter with the buttons [◀⊿–] or [⊿+▶].

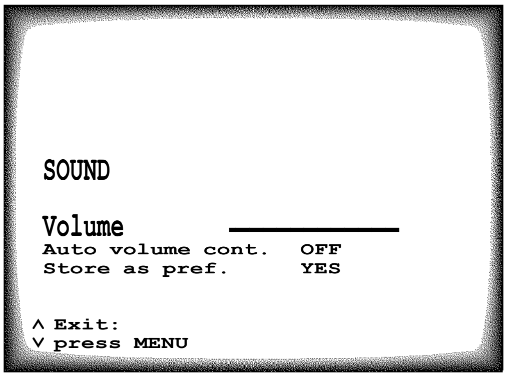
   ⓘ To store this setting as a standard setting, select the line '`Store as pref.`' with the menu buttons [P–▼] or [▲P+]. Select 'YES' and confirm with the [OK] button.

Volume control

You can control the volume level with the [⊿+/–◀▶] button. If you want to mute the sound temporarily (e.g.: during a telephone call), press the [🔇] button on the remote control. When you press the [🔇] button again, the sound will return at its original volume level.

Sound settings

1. Press the [MENU] button. The main menu will appear.
2. Select the line '`Sound`' with the [P–▼] or [▲P+] button and confirm with the [⊿+▶] button.



SOUND

Volume
Auto volume cont. OFF
Store as pref. YES

^ Exit:
v press MENU

3. Select the required line with the [P–▼] or [▲P+] button and alter with the [◀⊿–] or [⊿+▶] button.

   ⓘ To store this setting as a standard setting, select the line '`Store as pref.`' with the menu buttons [P–▼] or [▲P+]. Select 'YES' and confirm with the [OK] button.

   ⓘ To call up the standard settings, switch the TV-Video Combi off and on again.

Automatic volume control (AVL)

☐ Switch on '`Auto volume cont.`' to activate the automatic volume control. It minimises sudden changes in TV volume when commercial spots are transmitted.

5. PLAYBACK FUNCTIONS

Playing a cassette

1. Put a cassette into the cassette slot.
2. Press the PLAY ► button.
3. If you press the STOP ■ button once, the TV-VIDEO Combi will switch to pause. To stop, press the STOP ■ button again.
4. To eject the cassette, press the ■/▲ button.

   Some hired cassettes may have a poor picture or poor sound quality. This is not a fault in your machine. Please read 'Eliminating picture interference'.

   Some functions switch off automatically after a while (for example, pause, still picture, picture search). This helps to protect the cassette and avoids wasting power.

Playing NTSC cassettes

With this set you can play cassettes that have been recorded on another video recorder in the NTSC standard (for example, American cassettes).

Some special features (for example, still picture) are not possible while you are playing an NTSC cassette.

Tape position indication

Press the OK button to display the current tape position.

Searching for tape position with the picture (picture search)

1. While a cassette is playing, press the ◁◀ (reverse) or ▶▷ (forward) button once or several times.
2. To stop at a certain picture, press the PLAY ► button.

   During picture search, the picture quality may not be so good and there will be no sound.

Still picture

1. Press the STILL ▶◀ button. A still picture will appear on the screen.
2. Each time you press STILL ▶◀ again, the picture will move on one step.

Searching for tape position without the picture (wind and rewind)

1. Stop the tape with the STOP ■ button.
2. Press the ◁◀ (reverse) or ▶▷ (forward) button.
3. To stop at a certain picture, press the STOP ■ button.

Instant View

With this function you can switch to picture search during wind and rewind.

1. If you hold the ◁◀ (rewind) or ▶▷ (wind) button during wind or rewind, you will switch to picture search.
2. When you release the button, the TV-VIDEO Combi will automatically switch back to rewind or wind.

Automatic search for a tape position (index search)

At the start of each recording, the TV-VIDEO Combi will write an index code on the tape.

1. Press the INDEX ▶| button. Press the ▶▷ button to select the next code mark or the ◁◀ button for the previous code mark.
2. When the TV-VIDEO Combi finds the code mark, it will automatically switch to play.

Picture interference

When the picture quality is poor when you play a cassette, please follow these instructions.

Tracking during playback

1. During playback, press the MENU button.
2. Select the line 'Tape' with the buttons P−▼ or ▲P+ and confirm with the ⊿+▶ button.
3. Select the line 'Tracking' with the buttons P−▼ or ▲P+.
4. Hold the buttons ◀⊿− or ⊿+▶ until the playback quality is at its best.
5. Confirm with the OK button.
6. To end, press the MENU button. This setting will remain until you remove the cassette.

Tracking during still picture

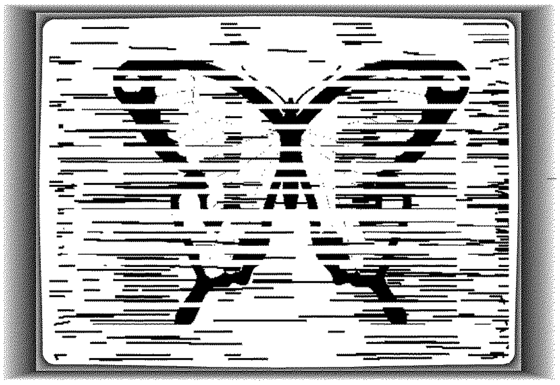
If the still picture vibrates vertically, you can improve the still picture as follows:

1. During still picture, press the MENU button.
2. Select the line 'Tape' with the P−▼ button or ▲P+ and confirm with the ⊿+▶ button.
3. Select the line 'Jitter' with the P−▼ or ▲P+ button.
4. Hold the ◀⊿− or ⊿+▶ button until the picture quality is at its best.
5. Confirm with the OK button.
6. To end, press the MENU button.

   ▷ Please note, however, that interference may still occur with poor quality cassettes.

Cleaning the video heads

If horizontal lines appear on the screen when you play a cassette, you should clean the video heads.



1. During playback, press the MENU button.
2. Select the line 'Tape' with the buttons P−▼ or ▲P+ and confirm with the ⊿+▶ button.
3. Select the line 'Cleaning' with the buttons P−▼ or ▲P+.
4. Press the OK button. 'CLEANING' will appear on the screen.
5. Wait a few seconds, until the message disappears and then press the MENU button.

6. MANUAL RECORDING

Use 'Manual Recording' to make a spontaneous recording (for example, a programme currently being shown).

- ☐ If you want to start and stop a recording manually, read the section: 'Recording without automatic switch-off'.
- ☐ If you want to start a recording manually but have it stopped automatically, read the section: 'Recording with automatic switch-off'.

Recording without automatic switch-off

1. Insert a cassette.
2. Use the P+/–▲▼ button to select the programme number you want to record, for example, 'P01'.
   ▷ Programme number '**E1**' is provided for recording from external sources (via the EXT.1 scart socket).
3. To start recording, press the RECORD/OTR● button on the remote control or ◉ on the TV-VIDEO Combi.
   When you are recording, the red recording light at the front of the TV-VIDEO Combi will be alight.
4. Stop recording with the STOP■ button.
   ▷ During a recording you can only watch the current programme.
   ▷ To switch off the screen, press the STANDBY⏻ button.

Recording with automatic switch-off (OTR one-touch-recording)

1. Put a cassette in the machine.
2. Use the P+/–▲▼ button to select the programme number you want to record.
3. Press the RECORD/OTR● button on the remote control.
   When you are recording, the red recording light at the front of the TV-VIDEO Combi will be alight.
4. Press the RECORD/OTR● button again and again until the display on the TV-VIDEO Combi shows the desired end time or length of the recording.
   ▷ To cancel this information, press the CLEAR button.
5. Confirm with the OK button.
6. To end, press the MENU button.

Protecting your recordings

So that you don't accidentally delete an important recording, remove the special tab on the narrow side of the cassette with a screwdriver or slide the special tab to the left. Later, if you no longer want to protect your recording, you can seal the gap again with sticky tape or slide the special tab to the right.

Auto-assembling

You can use the auto-assembling function to join individual recordings without any major picture disturbance between them.

1. While the cassette is playing, search for the correct position on the tape.
2. Stop the cassette by pressing the STOP■ button.
   '**Pause**' will appear on the TV screen.
3. Now start recording as usual by pressing the RECORD/OTR● button on the remote control.

Selecting the recording speed (SP or LP)

You can reduce the recording speed by half. This makes it possible to record, for example, eight-hours instead of four-hours on an 'E240' (four-hour) cassette.

1. Press the MENU button. The main menu will appear.

2. Select the line '`Tape`' with the P−▼ or ▲P+ button, and confirm with the ⊿+▶ button.

3. Select the line '`Tape speed`' with the P−▼ or ▲P+ button, and confirm with the ⊿+▶ button.

4. Select the required recording speed with the ◀⊿− or ⊿+▶ button.

   '`LP`': **L**ong **P**lay = half recording speed (double recording time).
   '`SP`': **S**tandard **P**lay = normal recording speed.

   The picture quality will be adversely affected when recording at half recording speed ('LP').

   For playback, the correct recording speed will automatically be selected.

5. Confirm with the OK button.

6. To end, press the MENU button.

7. PROGRAMMED RECORDING (TIMER)

Use programmed recording to automatically start and stop a recording at a later date.

To make a programmed recording, your TV-VIDEO Combi needs to know:

* the date you want to make the recording;
* the programme number for the TV channel you want to record;
* the start and stop time of the recording;
* whether you want to use VPS or PDC;
* the recording speed (SP/LP).

The TV-VIDEO Combi stores all the information in a TIMER block. You can programme up to 6 TIMER blocks a month in advance.

'VPS' (Video Programming System) and 'PDC' (Programme Delivery Control)

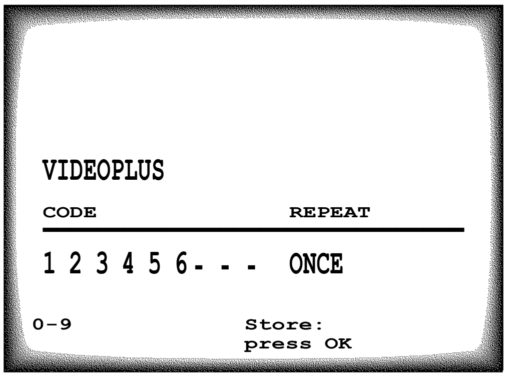
With 'VPS and PDC', the TV station controls the start time and the length of the recording. This means that the TV-VIDEO Combi switches itself on and off at the **right time** even if a TV programme you want to record begins earlier or finishes later than expected.
Usually the start time is the **same** as the VPS or PDC time. But if your TV guide gives a VPS or PDC time which is different to the programme's start time (for example, 20.15 and VPS 20.14), you must enter '20.14' as the start time.
If you want to programme a time that is different from the VPS or PDC time, you must switch off VPS or PDC.

Programming a recording (with 'VIDEOplus')

All the information required for a programming is contained in the PlusCode-programming number.

VIDEOplus+®

1. Press the TIMER ⏻ button on the remote control.
2. Select the line '`Videoplus`' with the buttons P–▼ or ▲P+ and confirm with the ⊿+▶ button.
3. Enter the entire PlusCode-programming number (up to 9 digits) printed in your TV guide next to the start time of a TV programme.
   For example, 5-234-89 or 5 234 89
   Enter 523489 for the PlusCode-programming number.
   If you make a mistake, you can clear your instructions with the CLEAR button.



VIDEOPLUS

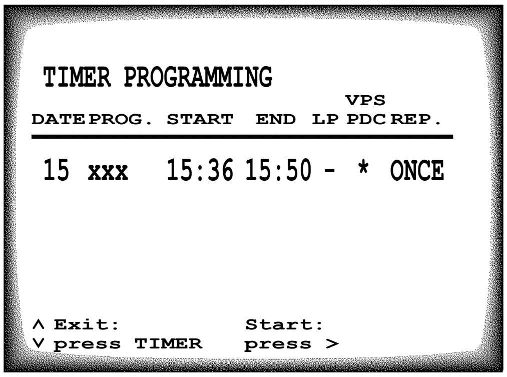
CODE REPEAT

1 2 3 4 5 6- - - ONCE

0-9 Store: press OK

4. In line '**REPEAT**' select daily or weekly programming with the P–▼ or ▲P+ button.
   '**Mo-Fr**': If you want to make a recording every day from Monday to Friday.
   '**Mo-Su**': If you want to make a recording every day from Monday to Sunday.
   '**WEEKLY**': If you want to make a recording every week on the same day of the week.
   '**ONCE**': If you want to make only one recording.

5 Confirm with the OK button. Your programming details will then appear on the TV screen.



```
TIMER PROGRAMMING
                                  VPS
DATE PROG.  START  END  LP  PDC REP.
15  xxx   15:36 15:50  -   *  ONCE

^ Exit:              Start:
v press TIMER        press >
```

If VIDEOPlus+ does not recognise the TV channel, '**P??**' will appear on the TV screen. Instead of '**P??**', you can select the programme number you want with the number buttons 0-9.

If '**Code error**' appears on the TV screen, this means you entered an incorrect PlusCode number or the incorrect date. Correct your instructions or end with the TIMER ⏲ button.

If '**Daily error**' appears on the TV screen, the date was incorrectly entered.

Under '**VPS/PDC**', use the P–▼ or ▲P+ button to switch 'VPS or PDC' on or off.

Under '**LP**', use the P–▼ or ▲P+ button to select the recording speed 'SP' or 'LP'.

The TIMER lamp on the front of the set will light up when one or more of the TIMER blocks are occupied.

When you are recording, the red recording light at the front of the TV-VIDEO Combi will be alight.

If the end of the cassette is reached during a recording, the TV-VIDEO Combi automatically ejects the cassette.

If you forget to load a cassette, '**No cassette**' will appear.

If you inserted a cassette with erase protection when you want to start a recording, the cassette will be ejected.

6 Confirm with the OK button.

☐ '**Press STANDBY to start recording**' will appear on the screen. If you have programmed a recording that should start within the next few minutes, confirm with the STANDBY ⏻ button. If you have programmed a recording that will start at some later point in time, confirm with the OK button.

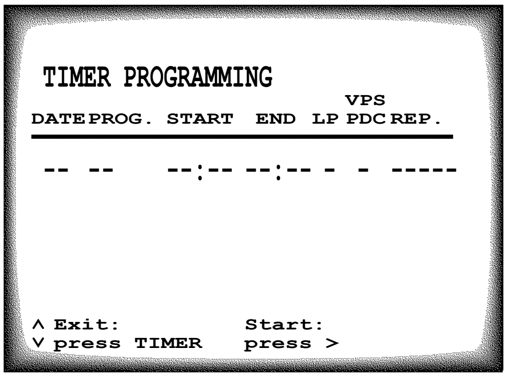
A programmed recording can only start, when the machine is switched to standby.

7 If you confirmed with the OK button, exit the menu with the TIMER ⏲ button.

Programming a recording (without 'VIDEOPlus')

1 Press the TIMER ⏲ button on the remote control.

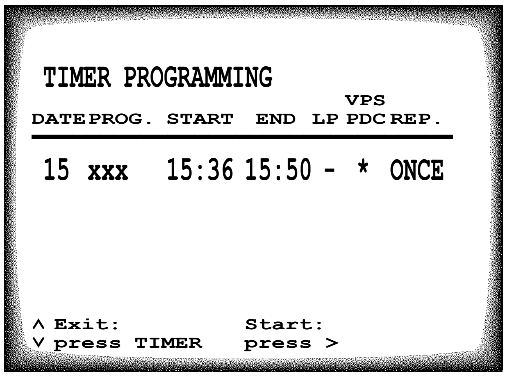
2 Select the line '**Timer programming**' with the buttons P–▼ or ▲P+ and confirm with the ⊿+▶ button.



```
TIMER PROGRAMMING
                                  VPS
DATE PROG.  START  END  LP  PDC REP.
-- --    --:-- --:--  -   -  -----

^ Exit:              Start:
v press TIMER        press >
```

3 Select a free TIMER block with the P+/–▲▼ button. Press the OK button.



```
TIMER PROGRAMMING
                                  VPS
DATE PROG.  START  END  LP  PDC REP.
15  xxx   15:36 15:50  -   *  ONCE

^ Exit:              Start:
v press TIMER        press >
```

4 Select the entry field with the ◀⊿– or ⊿+▶ button.

5 Enter information with the buttons P–▼ or ▲P+ or with the digit buttons 0-9.

Under '**REP.**', use the P–▼ or ▲P+ button to select daily or weekly programming.
'**Mo–Fr**': If you want to make a recording every day from Monday to Friday.
'**Mo–Su**': If you want to make a recording every day from Monday to Sunday.
'**WEEKL**': If you want to make a recording every week on the same day of the week.
'**ONCE**': If you want to make only one recording.

Under '**LP**', use the P–▼ or ▲P+ button to select the recording speed 'SP' or 'LP'.

Under '**VPS/PDC**', use the P–▼ or ▲P+ button to switch 'VPS or PDC' on or off.

6 Confirm with the OK button when the information is correct.

☐ '**Press STANDBY to start recording**' will appear on the screen. If you have programmed a recording that should start within the next few minutes, confirm with the STANDBY ⏻ button. If you have programmed a recording that will start at some later point in time, confirm with the OK button.

A programmed recording can only start, when the machine is switched to standby.

If you entered the wrong date for a daily/weekly recording, your TV-VIDEO Combi will correct it automatically.

7 If you confirmed with the OK button, exit the menu with the TIMER ⏲ button.

The programming information has been stored in a TIMER block.

8 Make sure that the cassette you have put in can be recorded on.

How to check or change a TIMER

1 Press the TIMER ⏲ button on the remote control.

2 Select the line '**Timer programming**' with the buttons P–▼ or ▲P+ and confirm with the ⊿+► button.

3 Select the TIMER you want to check or change with the P–▼ or ▲P+ button and confirm with the OK button.

4 Select the entry field with the ◄⊿– or ⊿+► button.

5 Change any information with the P–▼ or ▲P+ button or with the 0-9 buttons.

Under '**LP**', use the P–▼ or ▲P+ button to select the recording speed 'SP' or 'LP'.

6 Confirm with the OK button when the information is correct.

7 Confirm the message on the screen with the OK button. A TIMER recording can only start, if the set is not used for other video recorder functions (e.g. playback).

The programming information has been stored in a TIMER block.

8 To end, press the TIMER ⏲ button.

9 Make sure that the cassette you have put in can be recorded on.

How to clear a TIMER

1 Press the TIMER ⏲ button on the remote control.

2 Select the line '**Timer programming**' with the buttons P–▼ or ▲P+ and confirm with the ⊿+► button.

3 Select the TIMER you want to clear with the buttons P–▼ or ▲P+.

4 Press the CLEAR button.

5 Switch off with the TIMER ⏲ button.

8. ADDITIONAL FUNCTIONS

How to read TELETEXT

☐ Press the TELETEXT ▤ button to switch the TXT decoder on and off. The TV-VIDEO Combi is now receiving the TXT of the TV channel currently selected.

☐ To store the current page, press the OK button.
The next time you call up TELETEXT, you will automatically turn to this page.

☐ If you want to select an other page, type in the number of the page with the digit buttons 0-9. With the colour buttons on your remote control you can directly select the page numbers/chapters shown at the bottom of the TV screen.

Extra TELETEXT functions

To use the extra TELETEXT functions, press the MENU button, when you are in TELETEXT.

☐ To enlarge the print, select the symbol '⇕' and confirm with the OK button.

☐ To switch off the TELETEXT decoder temporarily, select the symbol '⊠' and confirm with the OK button.

☐ To call up a TELETEXT sub-page:

  1 Select the symbol '○' and confirm with the OK button.

  2 Enter the page number of the sub-page with the 0-9 -buttons (for example: 0123).

☐ To call up concealed information, select the symbol '⍰' and confirm with the OK button.

☐ To stop the pages from being turned over, select the symbol '⊜' and confirm with the OK button.

☐ To show TELETEXT transparently, select the symbol '▤' and confirm with the OK button.

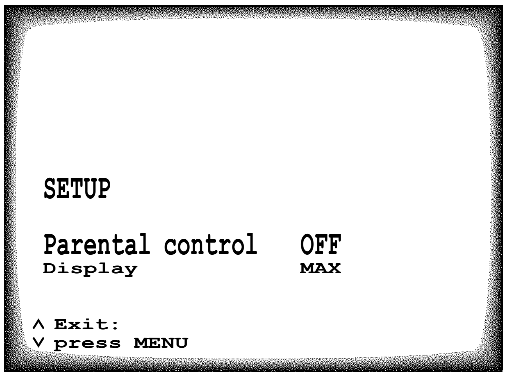
Parental control

This function will prevent unauthorised use of your TV-VIDEO Combi. All button-functions will be locked.

ⓘ You can make programmed recordings while the parental control is on.

1 Press the MENU button. The main menu will appear.

2 Select the line '`Setup`' with the P–▼ or ▲P+ button and confirm with the ⊿+► button.



SETUP

Parental control OFF
Display MAX

∧ Exit:
∨ press MENU

3 In the line '`Parental control`' select '`ON`' with the ◄⊿– or ⊿+► button.

4 Confirm with the OK button.

5 To end, press the MENU button.
Keep the remote control in a safe place.

6 If you want to switch off the parental control, select '`OFF`' in line '`Parental control`'.

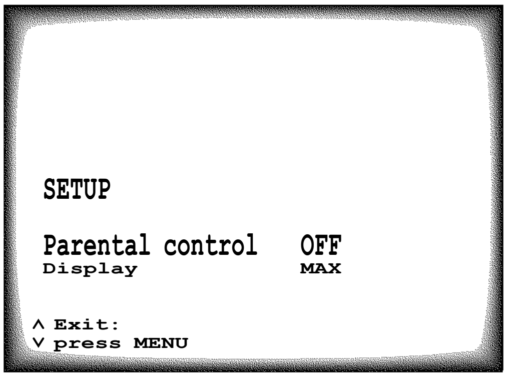
  ⓘ If a button is pressed with activated parental control, '`Parental Control active`' will appear in the display.

  ⓘ If you want to eject a cassette with activated parental control, press the STOP■ button several seconds.

Switching the On-screen display (OSD) on or off

You can switch the On Screen Display of the current operating information on or off.

1. Press the MENU button. The main menu will appear.
2. Select the line '**Setup**' with the buttons P–▼ or ▲P+ and confirm with the ⊿+▶ button.



SETUP

Parental control OFF
Display MAX

^ Exit:
v press MENU

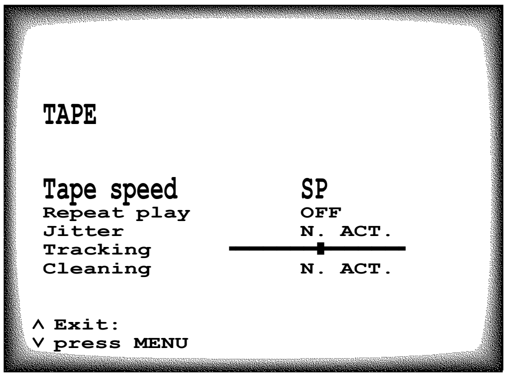
3. Select the line '**Display**' with the buttons P–▼ or ▲P+.
4. Select one of the options indicated with the buttons ⊿+▶ or ◀⊿–.
   '**MAX**': OSD appears for a few seconds each time an operating mode is selected and then disappears.
   '**MIN**': OSD is minimised.
   '**PROGR.**': the programme number is constantly indicated.
   '**COUNTER**': the counter is constantly indicated.
5. Confirm with the OK button.
6. To end, press the MENU button.

   ▷ You can use the OK button to show the current operating mode on your TV screen.

Continuous playback

You can automatically play a cassette again and again. When the end of the tape or the recording has been reached, it will rewind and start again.

1. Press the MENU button. The main menu will appear.
2. Select the line '**Tape**' with the buttons P–▼ or ▲P+. Confirm with the menu buton ⊿+▶.



TAPE

Tape speed SP
Repeat play OFF
Jitter N. ACT.
Tracking
Cleaning N. ACT.

^ Exit:
v press MENU

3. Select the line '**Repeat play**' with the buttons P–▼ or ▲P+.
4. Select '**ON**' with the buttons ◀⊿– or ⊿+▶. If you select '**OFF**', the function will be switched off.
5. Confirm with the OK button.
6. Press the MENU button.

Switch off function (SLEEP TIMER)

You can programme your set to switch off after a predetermined period.

1. Press the TIMER ◴ button on the remote control.
2. Select line '`Sleep timer`' with the P−▼ or ▲P+ button and confirm with the ⊿+▶ button.
3. Determine the time left until switch off in 15 minutes intervals using the P−▼ or ▲P+ button.

   ℹ You can switch the function off with the CLEAR button on the remote control.
4. Confirm with the OK button.
5. To end, press the TIMER ◴ button.

Switch on function (WAKE-UP TIMER)

You can programme your set to switch on at a predetermined time.

1. Press the TIMER ◴ button on the remote control.
2. Select line '`Wake-up timer`' with the P−▼ or ▲P+ button and confirm with the ⊿+▶ button.
3. Select the entry field with the ◀⊿− or ⊿+▶ button.
4. Enter the information with the P−▼ or ▲P+ button or with the number buttons 0-9.
5. In the line '`ON`', switch the function on or off.
6. Confirm with the OK button.
7. To end, press the TIMER ◴ button.

9. Before you call an engineer

If, contrary to expectation, you have any problems using this TV-VIDEO Combi, it may be caused by one of the reasons mentioned below. You can also call the **customer service centre**in your country.
You will find the phone number in the enclosed guarantee leaflet.

Your TV-VIDEO Combi does not respond to any button being pressed:
- There is no power supply: check the power supply
- A programmed recording is currently being made: cancel the programmed recording with the STANDBY ⏻ button.
- Parental control is on: switch the parental control off.
- Continuous playback is on: switch the continuous playback off.
- There is a technical problem: switch off with the ⏻ power switch for 30 seconds, then switch it on again.

Cassette is jammed in the TV-VIDEO Combi:
- Don't use force. Switch off with the ⏻ power switch for a moment.

Remote control does not work:
- Remote control not pointed toward the TV-VIDEO Combi: point it at the TV-VIDEO Combi.
- Batteries have run out: change the batteries.

No picture when you play a cassette:
- There is no recording on the cassette: change the cassette.

Poor picture quality when you play a cassette:
- The cassette badly worn or of poor quality: use new cassette.
- Tracking is not properly adjusted or the video heads are dirty: turn to chapter 'PLAYBACK' and read the section 'Eliminating picture interference'.
- You are playing a cassette with a LongPlay recording on it: Excellent picture quality is only guarateed with recordings made in StandardPlay recording speed.

The TV-VIDEO Combi will not record:
- The TV channel you want to record is not stored or you selected the wrong programme number: check TV channels stored.
- You have loaded a cassette which cannot be recorded on: undo the erase protection on the cassette.

Programmed recording does not work:
- You have not set the TIMER properly: check the TIMER blocks.
- You have programmed the wrong time or date: check time and date.
- You have put in a cassette that cannot be recorded on: undo the erase protection on the cassette.
- 'PDC' or 'VPS' switched on but 'PDC/VPS time' wrong: enter PDC or VPS time exactly to the minute. Have the aerial checked.

'Smart Clock' setting does not work:
- You have stored a TV channel on programme number 'P01' that does not transmit TELETEXT: On 'P01' store a TV channel that transmits TELETEXT.
- Poor TELETEXT reception: On 'P01' store a TV channel with good TELETEXT reception.
- You have not activated the Smart Clock function: Switch the function 'ON'.

You hear a very short and soft noise coming from your TV-VIDEO Combi at 3:00 at night:
- 'Smart Clock' is checking the time: Swith off the Smart Clock function.

TELETEXT does not start at page 100:
- You have stored a different preferred page: Store page 100 as preferred page.

Technical terms used

Current tape position : The part of the tape currently being played.
External source : A device connected via a socket (for example, scart socket) which is transmitting audio/video signals to the TV-VIDEO Combi.
Index marking : A marking which is automatically made on the tape at the beginning of every recording. This marking (recording ID) can be searched for with the Index search function.
Scart cable : Also known as a Euro-AV cable. This standard cable is an easy method of connecting various TV, audio and video devices, such as a HIFI and Dolby Surround set, video recorder, DVD player, SAT receiver, decoder, computer and similar devices. Other signals in addition to audio and video signals can be transmitted on it.
TV system : There are various systems for transmitting television signals, for example, PAL, SECAM, PAL BG, SECAM DK, SECAM L/L, NTSC etc. The system used by your television depends on which country you are in.
TXT : Also known as Teletext, Fasttext, Videotext, FLOF etc.
OTR : One touch recording. This function enables you to select the switch-off time in intervals of 30 minutes.